Shiawassee National Wildlife Refuge
6975 Mower Road
Saginaw, Michigan 48601

ANNUAL NARRATIVE REPORT

1971

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE

B-1750
Form NR-1
(Rev. March 1953)

WATERFOWL

REFUGE Shiawassee MONTHS OF Sept. TO January, 19 72

(1) Species	Sept. 1 1 4	5 2 11	12 3 18	19 4 25	Oct. 26 5 2	3 6 9	10 7 16	17 8 23	24 9 30	Nov. 31 10 6
(2) Weeks of reporting period										
Swans:										
Whistling										
Trumpeter										
Geese:										
Canada	800	800	7,000	15,000	20,000	7,000	12,000	12,000	12,000	12,000
Cackling										
Brant										
White-fronted										
Snow				3	20	20	30	30	60	60
Blue				20	140	140	200	200	740	740
Other										
Ducks:										
Mallard	1,000	2,000	5,000	9,000	11,000	6,000	35,000	35,000	35,000	12,000
Black	300	400	1,000	1,500	2,500	1,000	6,000	6,000	6,000	6,000
Gadwall										
Baldpate	50	100	200	500	1,000	1,000	1,000	1,000	500	5,000
Pintail	20	100	1,000	2,000	3,000	3,000	3,000	4,000	5,000	4,000
Green-winged teal	200	300	400	600	1,000	2,000	2,000	2,000	1,000	1,000
Blue-winged teal	400	600	1,000	1,500	2,000	1,000	1,000	1,000	500	500
Cinnamon teal										
Shoveler										
Wood	500	700	1,000	1,500	2,000	2,000	3,000	3,000	2,000	2,000
Redhead									5	5
Ring-necked									4	10
Canvasback								2	10	20
Scaup										
Goldeneye										
Bufflehead									4	4
Ruddy									35	20
Other										
Coot:	50	100	200	1,000	2,000	000	3,000	4,000	4,000	4,000

Int. Dup. Sec., Wash., D.C. 37944

13,000 total ducks

3-1750a
Cont. NR-1
(Rev. March 1953)

WATERFOWL
(Continuation Sheet)

REFUGE _____ MONTHS OF _____ TO _____, 19____

(1) Species	(2) Weeks of reporting period: 7 11 13 / 14 12 20 / 21 13 27 / 26 14 4 / 5 15 11 / 12 16 18 / 19 17 25 / 26 18 31	(3) Estimated waterfowl days use	(4) Production: Broods seen	(4) Production: Estimated total
Swans:				
Whistling	0 8 1 1	70		
Trumpeter				
Geese:				
Canada	12,000 14,000 12,000 5,000 5,000 5,000 5,000 5,000	1,131,200		
Cackling				
Brant				
White-fronted				
Snow	20 5 0 0 0 0 0 -	1,736		
Blue	780 195 0 0 0 0 0 -	22,085		
Other				
Ducks:				
Mallard	50,000 35,000 12,000 5,000 5,000 4,000 1,000 500	1,844,500		
Black	5,000 3,500 1,200 500 500 4,000 500 100	296,800		
Gadwall				
Baldpate	1,000 1,000 500 200 - - -	91,350		
Pintail	6,000 5,000 1,000 500 - - -	257,760		
Green-winged teal	300 200 - -	77,000		
Blue-winged teal	200 100 - -	61,600		
Cinnamon teal				
Shoveler	200 200 - -	2,800		
Wood	2,000 1,000 - -	144,900		
Redhead		70		
Ring-necked	10 10 10 10	378		
Canvasback	20 20 - -	504		
Scaup	20 20 10 10			
Goldeneye				
Bufflehead	10 5 - -	161		
Ruddy	20 10 - -	595		
Other				
Coots:	5,000 5,000 - -	219,450		

(over)

	(5) Total Days Use	(6) Peak Number	(7) Total Production
Swans	70	8	
Geese	1,154,421	20,160	
Ducks	2,778,398	64,780	
Coots	219,450	5,000	

SUMMARY

Principal feeding areas Farm Units 1, 3 and 4

Principal nesting areas

Reported by Refuge Personnel

INSTRUCTIONS (See Secs. 7531 through 7534, Wildlife Refuges Field Manual)

(1) Species: In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and national significance.

(2) Weeks of Reporting Period: Estimated average refuge populations.

(3) Estimated Waterfowl Days Use: Average weekly populations x number of days present for each species.

(4) Production: Estimated number of young produced based on observations and actual counts on representative breeding areas. Brood counts should be made on two or more areas aggregating 10% of the breeding habitat. Estimates having no basis in fact should be omitted.

(5) Total Days Use: A summary of data recorded under (3).

(6) Peak Number: Maximum number of waterfowl present on refuge during any census of reporting period.

(7) Total Production: A summary of data recorded under (4).

Interior Duplicating Section, Washington, D. C.
1953

3-1751
Form NR-1A
(Nov. 1945)

MIGRATORY BIRDS
(other than waterfowl)

Refuge Shiawassee Months of September to January 1972

(1) Species	(2) First Seen		(3) Peak Numbers		(4) Last Seen		(5) Production			(6) Total
Common Name	Number	Date	Number	Date	Number	Date	Number Colonies	Total # Nests	Total Young	Estimated Number
I. Water and Marsh Birds:										
Great Blue Heron			300	Sept.	1	Dec. 12				300
Green Heron			3	Sept.	1	Nov.				3
Common Egret			8	Oct.	1	Nov. 21				8
Double Crested Cormorant			1	Oct. 19	1	Oct. 19				1
II. Shorebirds, Gulls and Terns:										
Ring-billed Gull			100	Oct.	still	present				100
Herring Gull			50	Oct.	still	present				50

(over)

(1)	(2)	(3)		(4)		(5)	(6)
III. Doves and Pigeons:							
Mourning dove		250	Sept.	still	present		250
White-winged dove							
IV. Predaceous Birds:							
Golden eagle							
Duck hawk							
Horned owl	resident species						
Magpie							
Raven							
Crow	resident species						
Bald Eagle		3	Sept.	3	Nov. 28		3
Marsh Hawk		10	Sept.	2	Dec.		10
Red Tailed Hawk		20	Sept.	3	Dec.		20
Sparrow Hawk		30	Sept.	still	present		30
Snowy Owl		1	Oct.28	still	present		1
Turkey Vulture		10	Sept.	2	Nov.		10

Reported by Refuge Personnel

INSTRUCTIONS:

(1) Species: Use the correct names as found in the A.O.U. Checklist, 1931 Edition, and list group in A.O.U. order. Avoid general terms as "seagull", "tern", etc. In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and National significance. Groups: I. Water and Marsh Birds (Gaviiformes to Ciconiiformes and Gruiiformes)
II. Shorebirds, Gulls and Terns (Charadriiformes)
III. Doves and Pigeons (Columbiformes)
IV. Predaceous Birds (Falconiformes, Strigiformes and predaceous Passeriformes)

(2) First Seen: The first refuge record for the species for the season concerned.

(3) Peak Numbers: The greatest number of the species present in a limited interval of time.

(4) Last Seen: The last refuge record for the species during the season concerned.

(5) Production: Estimated number of young produced based on observations and actual counts.

(6) Total: Estimated total number of the species using the refuge during the period concerned.

INT.-DUP. SEC., WASH., D.C.

59317

3-1750b
Form NR-1B
(Rev. Nov. 1957)

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE

WATERFOWL UTILIZATION OF REFUGE HABITAT

Refuge Shiawassee For 12-month period ending August 31, 19 71

Reported by C. J. Bober Title Assistant Refuge Manager

(1) Area or Unit Designation	(2) Habitat Type	Acreage		(3) Use-days	(4) Breeding Population	(5) Production
	Crops	2,974	Ducks	4,791,780	500	101
	Upland	366	Geese	2,544,948	1,000	292
	Marsh	1,179	Swans	53,984		
	Water	192	Coots	77,420	400	
	Total	4,711	Total	7,468,132	1,900	393
	Crops		Ducks			
	Upland		Geese			
	Marsh		Swans			
	Water		Coots			
	Total		Total			
	Crops		Ducks			
	Upland		Geese			
	Marsh		Swans			
	Water		Coots			
	Total		Total			
	Crops		Ducks			
	Upland		Geese			
	Marsh		Swans			
	Water		Coots			
	Total		Total			
	Crops		Ducks			
	Upland		Geese			
	Marsh		Swans			
	Water		Coots			
	Total		Total			
	Crops		Ducks			
	Upland		Geese			
	Marsh		Swans			
	Water		Coots			
	Total		Total			
	Crops		Ducks			
	Upland		Geese			
	Marsh		Swans			
	Water		Coots			
	Total		Total			

(over)

3-1750c
Form NR-10
(Sept. 1960)

WATERFOWL HUNTER KILL SURV.

Refuge Shiawassee Year 1971

(1) Weeks of Hunting	(2) No. Hunters Checked	(3) Hunter Hours	(4) Waterfowl Species and Nos. of Each Bagged	(5) Total Bagged	(6) Crippling Loss	(7) Total Kill	(8) Est. No. of Hunters	(9) Est. Total Kill
10/1-7	602	3,010	Canada Goose	145	u	145	602	145
10/8-14	680	3,400	" "	124	u	124	659	124
10/15-21	604	3,020	" "	136	u	136	571	136
10/22-28	677	3,385	" " (1 Snow)	41	u	41	677	41
10/29-11/4	610	3,050	" "	7	u	7	610	7
11/5-11	466	2,330	" "	5	u	5	466	5
11/12-14	150	750	" "	2		2	150	2
Sub Totals	3,789	18,945		460	u	460	3,789	460
	Permits Issued By State							
10/1-31	511	1,963	" "	138	u	138	511	138
11/1-14	138	473	" "	8	u	8	138	8
Totals	4,438	21,381	Canada Goose - 605 Snow Goose - 1	606	u	606	4,438	606

(over)

3-1752
Form NR-2
(April 1946)

UPLAND GAME BIRDS

Refuge Shiawassee Months of September to January, 19 72

(1) Species	(2) Density		(3) Young Produced		(4) Sex Ratio	(5) Removals			(6) Total	(7) Remarks
Common Name	Cover types, total acreage of habitat	Acres per Bird	Number broods obs'v'd.	Estimated Total	Percentage	Hunting	For Re-stocking	For Research	Estimated number using Refuge	Pertinent information not specifically requested. List introductions here.
Ring-Necked Pheasant	8,000 Acres Crop-lands, hardwoods, marshes, and bottomlands	1/00	0	0					20	Rarely seen

3-1753
Form NR-3
(June 1945)

BIG GAME

Refuge Shiawassee Calendar Year 1971

(1) Species	(2) Density	(3) Young Produced	(4) Removals				(5) Losses			(6) Introductions		(7) Estimated Total Refuge Population		(8) Sex Ratio
Common Name	Cover types, total Acreage of Habitat	Number	Hunting	For Re-stocking	Sold	For Research	Predation	Disease	Winter Loss	Number	Source	At period of Greatest use	As of Dec. 31	
White-tailed Deer	Bottomland hardwoods, croplands, marsh 8,000 acres	300	135									535	400	1:5

Remarks:

Estimated removals by hunting include 45 taken during firearm season, 70 during archery season, and an estimated 20 illegal and/or unretrievable kills.

Reported by _____

3-1754
Form NR-4
(June 1945)

SMALL MAMMALS

Refuge Shiawassee Year ending April 30, 1971

(1) Species	(2) Density		(3) Removals					(4) Disposition of Furs						(5)
								Share Trapping						Total Popula-
Common Name	Cover Types & Total Acreage of Habitat	Acres Per Animal	Hunting	Fur Harvest	Predator Control *	For Re-stocking	For Re-search	Permit Number	Trappers Share	Refuge share	Total Refuge Furs Shipped	Furs Donated	Furs Destroyed	tion
Cottontail Rabbit	8,000 ac. croplands, bottomland hardwoods, and marshes.													Unknown
Fox Squirrel	" " "													Unknown
Red Squirrel	" " "													Unknown
Opposum	" " "			13										30
Raccoon	" " "			7	2									50
Striped Skunk	" " "			6										20
Woodchuck	" " "				10									200
Red Fox	" " "			32										100
Muskrat	1,000 ac. Cattail marsh, rivers, and drainage ditches.			220				T-9940	147	73				3000
				289				T-9941	183	96				
				420				T-9942	140					
Beaver	" " "			8										70
Mink	" " "													Unknown
Weasel	" " "													Unknown

* List removals by Predator Animal Hunter

REMARKS:

Reported by _____

3-1755
Form NR-5

DISEASE

Refuge Shiawassee Year 1972

Botulism

Period of outbreak None

Period of heaviest losses _____

Losses:

	Actual Count	Estimated
(a) Waterfowl		
(b) Shorebirds		
(c) Other		

Number Hospitalized	No. Recovered	% Recovered
(a) Waterfowl		
(b) Shorebirds		
(c) Other		

Areas affected (location and approximate acreage) _____

Water conditions (average depth of water in sickness areas, reflooding of exposed flats, etc.

Condition of vegetation and invertebrate life _____

Remarks _____

Lead Poisoning or other Disease

Kind of disease None

Species affected _____

Number Affected Species	Actual Count	Estimated

Number Recovered _____

Number lost _____

Source of infection _____

Water conditions _____

Food conditions _____

Remarks _____

INT.-DUP., D.C.- 53818-59

3-1757
Form NR-7
(Rev. June 1960)

NONAGRI[illegible]RAL COLLECTIONS, RECEIPTS, A[illegible]ANTINGS (1)

Refuge Chiwaukee Year 19 71

Species	Collections and Receipts (Seeds, rootstocks, trees, shrubs)						Plantings (Marsh - Aquatic - Upland)						
	Amount (Lbs., bus., etc.)	(2) C or R	Date	Method or Source	Cost	(3) Total Amount on Hand	Location of Area Planted	Rate of Seeding or Planting	Amount Planted (Acres or Yards of Shoreline)	Amount and Nature of Propagules	Date	Survival	Cause of Loss
							Nesting Islands Pools 1 & 2	2 lb./ac.	10 ac.	Alsike Clover	July Sept.	25%	Lack of precip.
							Nature Trail Evon Road	4 lb./ac.	1 ac.	Ladina Clover	June	75%	
							Dikes Constructed Under Contract	18 lb./ac	65 ac.	Brome Grass 4 lbs. Red Fescue 4 lbs. Rye Grass 4 lbs. Ladina Clover 2 lbs. Alsike Clover 2 lbs. Birdsfoot Trefoil 2 lbs.	Sept	60%	Lack of growing weather

(1) Report agronomic farm crops on Form NR-8
(2) C = Collections and R = Receipts
(3) Use "S" to denote surplus

Remarks: _____

Total acreage planted:
Marsh and aquatic _____
Hedgerows, cover patches _____
Food strips, food patches _____
Forest plantings _____

76148

3-1757
Form NR-7
(Rev. June 1960)

NONAGRICULTURAL COLLECTIONS, RECEIPTS, AND PLANTINGS (1)

Refuge Shiawassee Year 19 72

	Collections and Receipts (Seeds, rootstocks, trees, shrubs)						Plantings (Marsh - Aquatic - Upland)						
Species	Amount (Lbs., bus., etc.)	(2) C or R	Date	Method or Source	Cost	(3) Total Amount on Hand	Location of Area Planted	Rate of Seeding or Planting	Amount Planted (Acres or Yards of Shoreline)	Amount and Nature of Propagules	Date	Survival	Cause of Loss
None							None						

(1) Report agronomic farm crops on Form NR-8
(2) C = Collections and R = Receipts
(3) Use "S" to denote surplus

Total acreage planted:
Marsh and aquatic _____
Hedgerows, cover patches _____
Food strips, food patches _____
Forest plantings _____

Remarks: _____

74148

3-1758
Form NR-8
(Rev. Jan. 1956)

Fish and Wildlife Service Branch of Wildlife Refuges

CULTIVATED CROPS - HAYING - GRAZING

Refuge Shiawassee County Saginaw State Michigan

Cultivated Crops Grown	Permittee's Share Harvested		Government's Share or Return				Total Acreage Planted	Green Manure, Cover and Waterfowl Browsing Crops Type and Kind	Total Acreage
			Harvested		Unharvested				
	Acres	Bu./Tons	Acres	Bu./Tons	Acres	Bu./Tons			
Soybeans	350	11,008	7	244	-	-	376	Ryegrass in corn	123
White beans	385	5,720	27	468	-	-	665		
Kidney beans	90	920	-	-	-	-	90	Clover w/small grain	206
Field Corn	563	40,826	77	3,005	93	6,974	738	Wheat/Rye/Oats	597
Sorgum					10	400	10		
Sudex					15	600	15	Winter wheat	143
Barley			21	950	146	5,640			
Millet					25	1,250	25		
Wheat	145	7,066	31	2,660	10	450	186		
Buckwheat					500	25,000	500		
Sugar beets	58	1,450 T.			13	325 T.	71		
								Fallow Ag. Land	0

No. of Permittees: Agricultural Operations 17 Haying Operations 0 Grazing Operations 0

Hay - Improved (Specify Kind)	Tons Harvested	Acres	Cash Revenue	GRAZING	Number Animals	AUM'S	Cash Revenue	ACREAGE
				1. Cattle				
				2. Other				
				1. Total Refuge Acreage Under Cultivation				2,843
Hay - Wild				2. Acreage Cultivated as Service Operation				0

3-1570
NR-58
(1/54)

REFUGE GRAIN REPORT

Refuge Shiawassee Months of January through December, 1971

(1) Variety*	(2) On Hand Beginning of Period	(3) Received During Period	(4) Total	(5) Grain Disposed of				(6) On Hand End of Period	(7) Proposed or Suitable Use*		
				Transferred	Seeded	Fed	Total		Seed	Feed	Surplus
shelled corn	890	1,985	2,875	1,147		284		1,444		979	465

(8) Indicate shipping or collection points

(9) Grain is stored at 234 bu. at Birch Run Elevator; 1,210 bu. in Refuge secondary headquarters grainery

(10) Remarks Surplus for transfer to Seney Refuge

*See instructions on back.

3-1761
Form NR-11
(2/46)

TIMBER REMOVAL

Refuge Chincoteague Year 1972

Permittee	Permit No.	Unit or Location	Acreage	No. of Units Expressed in B. F., ties, etc.	Rate of Charge	Total Income	Reservations and/or Diameter Limits	Species Cut
none								

Total acreage cut over..... Total income.....

No. of units removed B. F..... Method of slash disposal.....

Cords.....

Ties.....

.....

INT.-DUP. SEC., WASH., D.C. 36103

Shiawassee National Wildlife Refuge

Annual Narrative Report

1971

PERSONNEL

John R. Frye	-	Refuge Manager (transferred 8/6/71)
Robert H. Timmerman	-	Refuge Manager (EOD 8/13/71)
Gary A. Evans	-	Assistant Refuge Manager (EOD 1/25/71)
Gaylord J. Bober	-	Assistant Refuge Manager
S. Sam Poma	-	Refuge Clerk (transferred 11/29/71)
Lawrence J. Blazo	-	Engineering Equipment Operator
Kenneth H. Shelley	-	Medium Equipment Operator

TEMPORARY PERSONNEL

Richard Papasso	-	Biological Aid (wildlife)
Myron Swenson	-	Biological Technician
Alton M. Nelson	-	Laborer

NEIGHBORHOOD YOUTH CORPS PERSONNEL

Jack Reynolds
Alvin Roby
William Banks
Joseph Jackson
Rex Laury

United States Department of the Interior
Fish and Wildlife Service
Bureau of Sport Fisheries and Wildlife

Shiawassee National Wildlife Refuge
6975 Mower Road
Saginaw, Michigan 48601

CONTENTS

I. GENERAL

A. Weather Conditions - 1971

	Precipitation			Maximum	Minimum
	Month	Normal	Snowfall	Temp.	Temp.
January	.95	1.11	8.3	41	-7
February	.77	1.76	4.2	51	-9
March	2.35	1.28	23.10	58	25
April	.79	3.35	-	75	19
May	.95	3.08	-	86	31
June	.80	3.89	-	101	40
July	2.35	3.56	-	94	45
August	2.57	2.74	-	93	40
September	2.20	2.39	-	93	35
October	2.84	3.54	-	90	34
November	.82	3.93	5.00	69	8
December	3.98	1.75	9.60	62	6
Annual Totals	21.37	32.38	50.2 Extremes	101	-9

January was a normal month with 7 inches of snow on the ground at the beginning of the year. The snow cover remained throughout mid-February. January had 3 days with below zero temperatures and 2 days of below zero temperature were recorded in February. Rain occurred on February 17, 19 and 20, and caused a rise in the Flint River. By February 22, Farm Units 2F, 3 and 4, and the main road into the refuge were under 6 feet of water. By early March, flood waters had receded but on March 19, we were again flooded because of heavy precipitation and snow runoff. By March 26, the water began to drop but the main entrance road to the refuge was still flooded; making it necessary to use both boat and feet to get to Secondary Headquarters. By March 29, the water receded enough to allow ingress and egress by refuge vehicles.

From April through June the skies went dry. By the end of June the refuge was 7.86 inches of precipitation below normal. The lack of moisture caused many bean and sugar beet fields to germinate late and the beets were plowed under as a result.

Moisture in July and August was near normal and crops reacted accordingly. The fall months were again below normal in precipitation and the refuge staff enjoyed a dry goose season.

The latter part of December was extremely wet and precipitation was well above normal. Seven inches of snow were on the ground at the end of the year and the soil was well saturated with water.

B. Habitat Conditions.

1. Water. The water level had been lowered for dike construction in the fall of 1970, causing water elevations in Pools 1 and 2 to be below approved levels at the start of the year. Pool 3 was dry at the start of the year.

There were two periods of flooding this year. The first flooding occurred from February 25 to March 5. During this period the Spaulding Drain's west dike was washed out at several points inside the refuge and water flowed west across the Pool 5 area and into the Eastwood Drain. The Eastwood Drain was not large enough to carry the excess water from the Spaulding Drain and quickly overflowed its dikes and flooded Farm Units 3 and 4. At this time, the water was trapped inside of Farm Units 3 and 4 and rose until it topped the south dike of Pool 2 and flowed through Pool 2 into the Shiawassee River.

The weather turned colder and flood water had receded by March 5. We received 8 inches of snow on March 6, and 7, which set the stage for our second flooding. Temperatures rose on March 13 and by March 18 all river elevations had risen. The remainder of March had temperatures above freezing during the daylight hours and brief showers. The resulting flood followed the same pattern as the first flood for a day or two. After which Farm Units 2A, 2C, 7, 8, and Pool 1 were also flooded.

Farm Unit 1, approximately 1,200 acres in the center of the refuge, did not flood but was completely surrounded by water.

During April the croplands dried out, farming operations started and several breaks in the dikes were repaired. During the month water levels in Pools 1A, 2 and 3 were brought to approved elevations.

Pool 1B was almost dry before the break in the east dike was repaired. On April 27, water levels in Pools 1A and 1B were equalized through the control structure. At that time we did not have an operational pump for this pool.

Pools 1 and 2 were drained in May to allow construction work to progress on the pool dikes. Pool 3 was drained the third week of June. Pool 3 is being managed as a food production area and it is hoped that the timber in the pool will not be killed.

Reflooding was started during August in Pool 2 and during September for Pool 1. The pools were slowly brought as near as possible to approved elevation by freeze-up time.

In summation, you could say that during the year we had too much water, followed by no water, and finally ideal conditions in the Pools. The rivers furnished water habitat throughout the year but use was low. The refuge staff feels the low use of the river areas was the results of fluctuating water levels which were caused by periodic flood conditions and wind tides throughout the year.

2. Food and Cover.

Food and cover conditions were excellent for all wildlife species during the year. Spring migrants found extensive areas of flooded cropland to feed on. Especially sought out were interior flooded corn fields where the refuge share of corn was knocked down early in the winter. Flooded lands on the east side of the Spaulding Drain were also used heavily so spring concentrations were spread over a major portion of the refuge. Major pools were used primarily for resting with availability of natural foods in the pools being hindered by high water.

The pools were drained in late May after the goslings hatched. Draining of the pools was accomplished in order to facilitate construction of new dikes, water control structures and to rehabilitate the pools by disking undesirable species such as cattail and willow. Also, a number of acres of smartweed were disked in Pools 1A and 1B to regenerate growth. New goose resting islands were constructed and old ones repaired in Pools 1A, 1B and 2. The Pools were partially reflooded by October and were used extensively by fall migrants for feeding and resting.

Pool 3 was flooded in the spring. This area was used primarily by dabbling ducks for resting. Water was drained from the pool the third week of June to alleviate damage to the standing timber.

The refuge share of the 1971 crop that was left in the fields consisted of 98 acres of field corn, 10 acres of sorgum, 15 acres of sudex, 146 acres of barley, 25 acres of millet, 10 acres of wheat, 500 acres of buckwheat, and 13 acres of sugar beets. An additional 1069 acres were seeded to browse, primarily wheat and rye. Migrants made good use of this browse through early fall. Sugar beets were not utilized by geese this year. No beets were left in the center of the refuge or heavy concentration area but were left as perimeter croplands. Geese did land in one beet field but fed on corn adjacent to it. There was no indication that the geese fed on the beets. The beets were topped but left in the ground during the goose season. They were lifted after the season was completed. A number of acres of white beans were not harvested by the permittees due to their low yield. Those beans left in the center of the refuge were fed on extensively by the geese. Crops around the periphery of the refuge and surrounding farm lands received little use.

II. WILDLIFE

A. Migratory Birds.

1. Whistling Swans. The first spring migrants were observed on March 3, when four swans were sighted resting on the Shiawassee River, north of Pool 1. The following week the population had risen to 100. The population peaked the second week of April when 3,600 swans used the refuge. By the third week of April, the population had dropped to 80. The final spring sighting of swans was made the last week in May when two were seen and it is thought that those birds were sick.

   The fall period was normal in that the refuge received little use by swans but many were seen flying over the area.

   The following table gives the ten-year peak population figures and use days by swans at this station.

Swan Use Days

Year	Spring	Summer	Fall	Total
1971	53,886	98	70	54,054
1970	73,990	105	0	74,095
1969	112,528	0	371	112,899
1968	29,512	105	434	30,051
1967	28,567	49	35	28,651
1966	37,324	240	2,667	40,231
1965	35,536	231	28	35,795
1964	10,038	0	35	10,073
1963	22,645	0	0	22,645
1962	58,618	0	133	58,751

Peak Spring Swan Populations

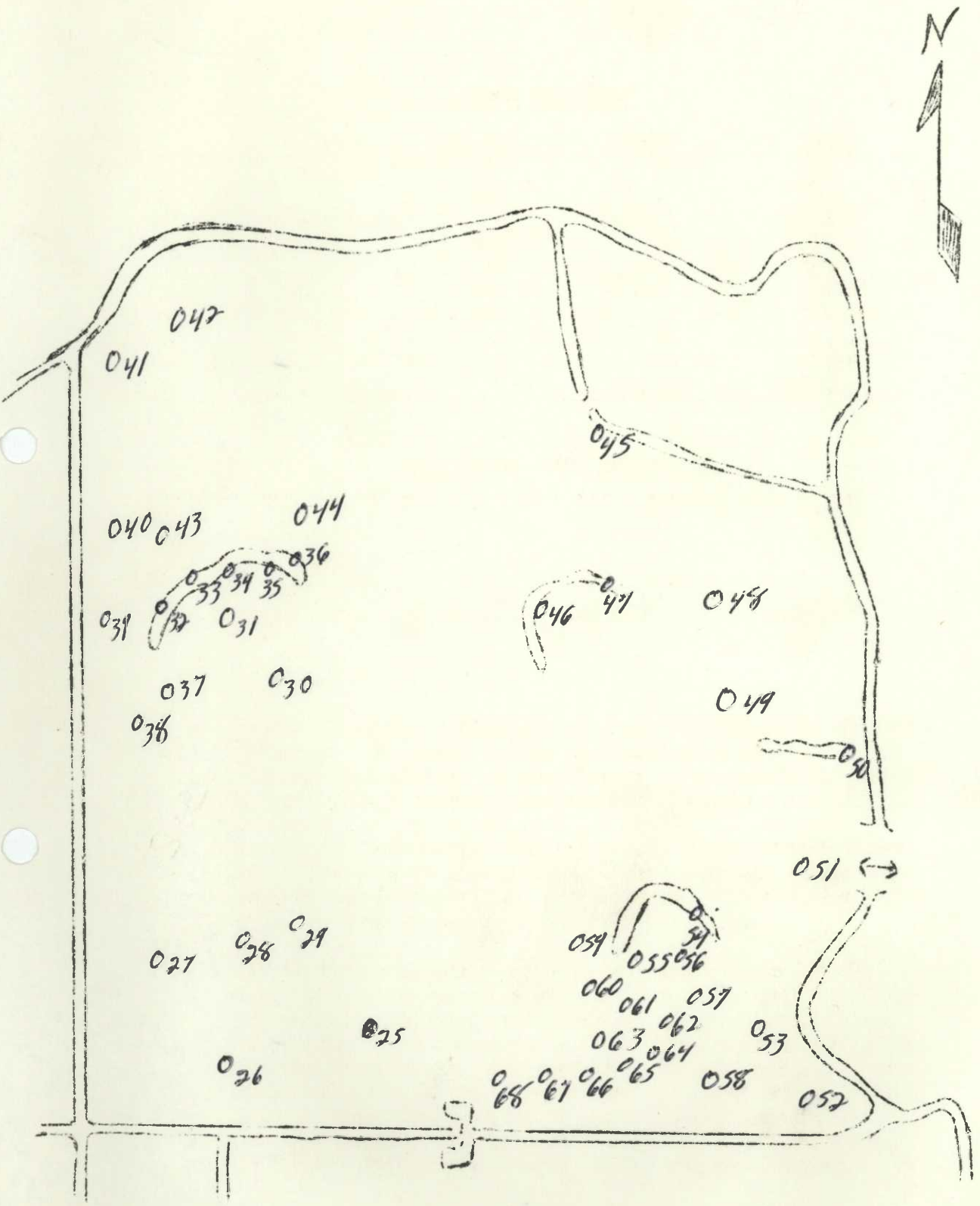
1971	3,600	1966	2,500
1970	4,000	1965	2,000
1969	6,000	1964	500
1968	2,000	1963	2,200
1967	2,000	1962	5,000

2. Geese. The refuge started the year with no geese in the vicinity. The first spring migrants were sighted on February 24, sitting on the frozen river, north of Pool 2. By March 1, the population had risen to 1,000 geese.

The population reached 30,000 by the third week in March and dropped to 17,000 by April 3rd. A second major movement out of the area took place during the last two weeks of April when 12,000 geese left the refuge.

The first pre-nesting activity was observed on March 18, when pairs were observed on the islands in Pool 1. Peak pre-nesting activity took place the last week of March. Once again there appeared to be a great deal of conflict between the nesting geese and the migrant geese. It was often possible to see several loafing geese on an island where a goose was sitting on a nest. The gander, in some cases, appeared to become very lax about defending his territory when he was so vastly outnumbered.

The nest survey this year was conducted on April 30 and May 3. A total of 71 nests were found, this is one less than last year. There were 44 nests in Pool 1A, 24 in Pool 1B and 3 in Pool 2. Sixty-four nests contained eggs and the average number of eggs per nest was 5.32.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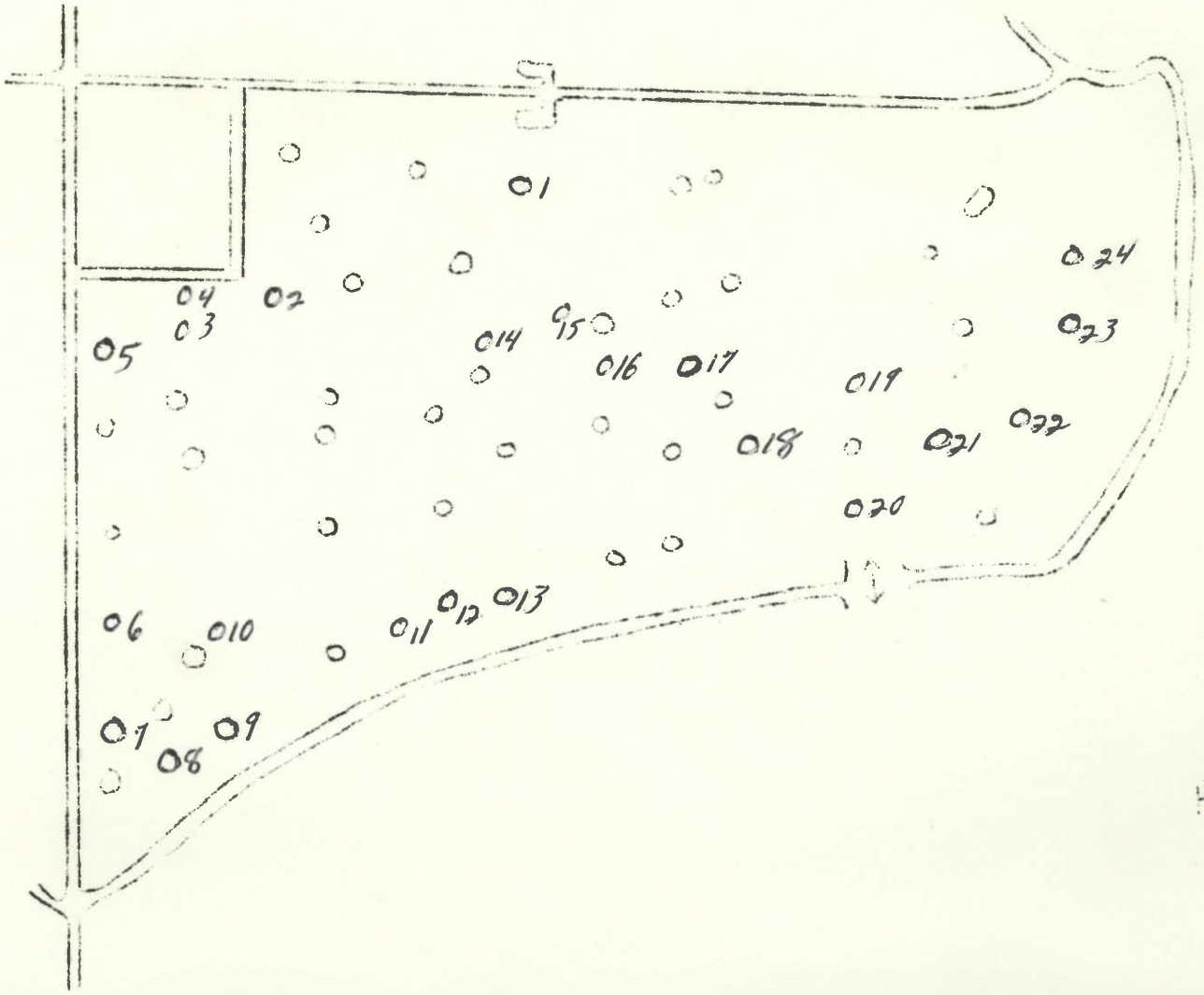
Pool 1A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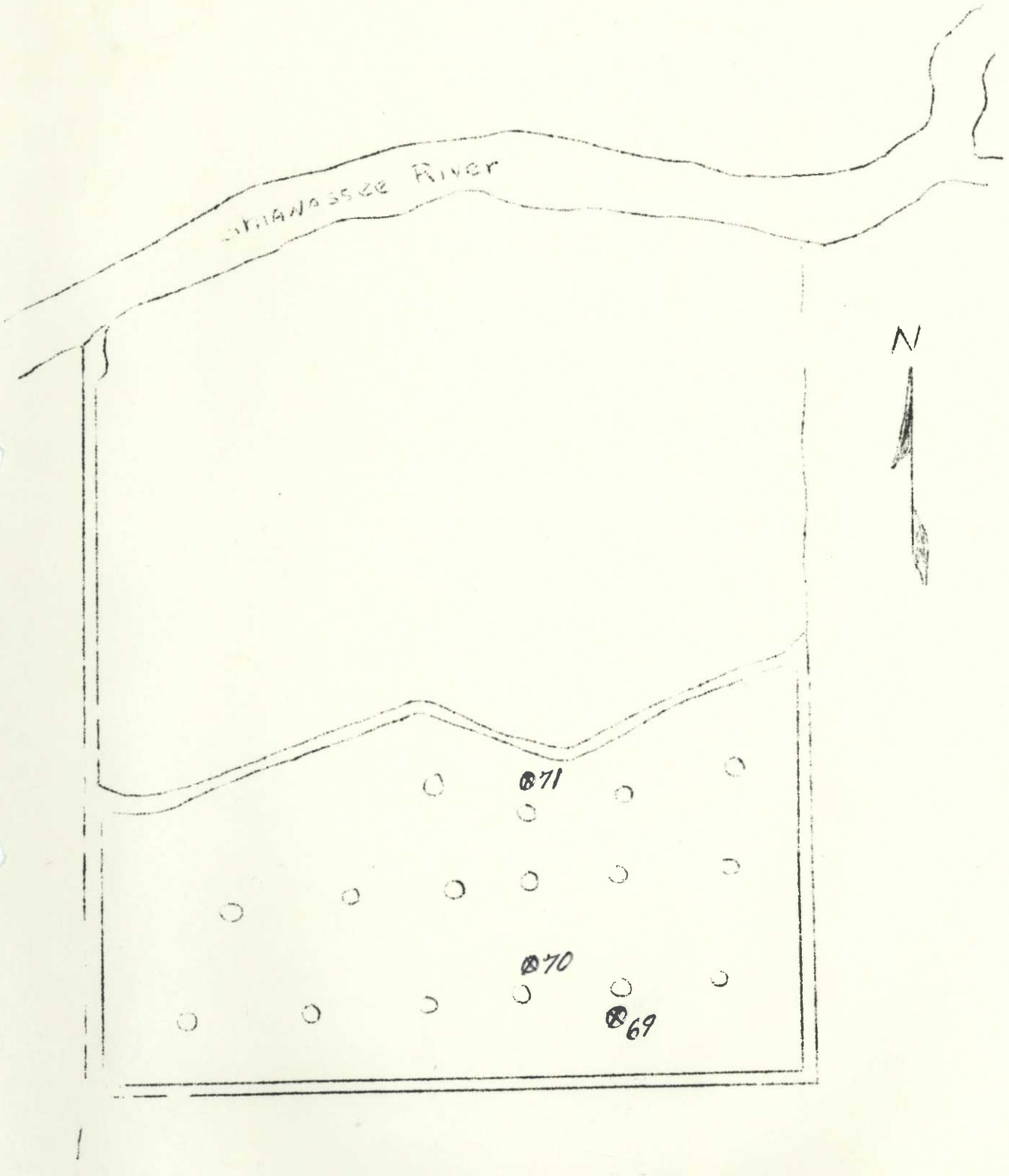
Pool 1b



Pool 2

The following table sums up the gathered information.

Number of Nests and Eggs per Pool - 1971

Pool	No. Nests	No. Eggs	No. Nests Deserted	No. Eggs Deserted or Destroyed	No. Eggs Not Destroyed	Ave. Eggs Per Nests	Est. No. Eggs Hatched *
Pool 1A	44	224	4	11	213	5.32	198
Pool 1B	24	94	7	39 est.	94	5.53	83
Pool 2	3	12	0	0	12	4.00	11
Total	71	330	11	11	319	5.32	292

*Based on the fact that 88.2% of total eggs laid in 1970 hatched.

Locations of Goose Nests - 1971

Pool	Islands (92%)	Nest Tubs (0%)	Muskrat Houses (6%)	Other (2%)	Total (100%)
Pool 1A	41	0	1	2	44
Pool 1B	24	0	0	0	24
Pool 2	0	0	3	0	3
	65	0	4	2	71

The first brood was observed hatching in the afternoon on May 3. The peak hatching period was from May 10 through May 20. This year, roughly one-third of the nests were destroyed or deserted in Pool 1B when the pool went dry in April, due to a break in the East Dike. Otherwise it appeared to be a good year for our nesting flock.

The goslings were drive-trapped on June 16. Personnel from the State assisted and a total of 176 goslings were banded or approximately 60 per cent of the total produced.

The first fall migrants arrived the third week of September when the population increased by 6,000. The next two weeks saw the population gain 13,000 additional geese to reach 20,000 which became our peak population.* By October 9, the population had dropped to 7,000, and by October 16, the population had increased to 12,000. The refuge staff was puzzled by the low peak population and the resulting drop in use days. At the close of the year there were still 5,000 geese using the refuge although there was only a very small area of open water in the Shiawassee River and the weather was quite severe.

The Snow and Blue Geese made a small showing during the spring migration and the peak population was 15 sighted on March 24. The first fall arrivals appeared during the week of September 19, when 23 blues and snows moved into the refuge. The population peaked at 1,000 the last week of October.

Goose Use Days

	Spring	Summer	Fall	Total
1971	808,668	108,500	1,154,421	2,071,589
1970	1,242,227	158,921	1,627,780	3,028,928
1969	865,560	137,900	1,910,055	2,913,515
1968	421,484	110,600	1,148,622	1,680,706
1967	502,110	61,542	568,477	1,132,129
1966	537,341	63,000	807,737	1,408,078
1965	425,565	21,245	618,870	1,065,680
1964	406,302	38,280	437,022	881,604
1963	529,200	67,050	214,203	810,453
1962	260,160	48,300	188,920	497,380

Peak Goose Population and Production

	Spring	Summer	Fall	Production	
1971	30,000	1,200	20,160	292	
1970	32,000	1,500	25,000	312	
1969	30,600	1,100	37,000	100	May Flooding
1968	15,000	900	19,600	300	
1967	19,400	620	9,460	180	
1966	15,000	500	18,300	200	
1965	22,300	300	12,200	100	
1964	15,000	350	7,525	150	
1963	23,800	575	3,800	175	
1962	10,000	450	2,900	215	

* (See table for ten year population data.)

3. Ducks. The first ducks to arrive on the refuge in 1970 made their appearance on February 23, when 24 mallards and 2 black ducks were seen feeding in Farm Unit 4.

The next species to make their appearance were 3 pintails on March 4, and common merganser and coots on March 5. The first divers were sighted on March 18, when 2 scaup were observed on the Shiawassee River. Redheads were present by March 24, and buffleheads and goldeneyes on March 26. All common species of ducks had arrived by the last week of March.

The peak of the spring migration for ducks occurred around April 1, when 11,866 ducks were present. There was a gradual movement out of the area during the month of April, and by the end of the month there were just over 2,000 ducks using the refuge.

The pools were dry during the summer and few broods were observed. Two hooded merganser, three mallard, two wood duck, and three blue wing teal broods were observed using the Pool 3 area. It was estimated that a total of 100 ducks were produced on the area in the past year. Next year when we are able to manage the major pools this figure should increase.

Duck Use Day

	Spring	Summer	Fall	Total
1971	287,924	114,786	2,778,398	3,181,108
1970	305,523	710,412	4,389,070	5,405,005
1969	193,494	394,037	4,131,843	4,719,374
1968	505,656	372,870	4,517,800	5,396,326
1967	185,346	266,329	3,590,419	4,042,094
1966	574,840	234,234	2,271,885	3,080,959
1965	296,522	160,685	1,755,089	2,212,296
1964	904,637	138,719	1,587,075	2,630,431
1963	1,192,040	181,265	1,609,520	2,982,825
1962	1,014,705	140,750	1,457,278	2,612,733

Peak Duck Populations and Production

	Spring	Summer	Fall	Production
1971	11,866	1,458	64,780	100
1970	12,102	12,200	66,130	260
1969	7,007	11,490	70,200	300
1968	26,538	11,850	88,000	195
1967	7,670	12,210	71,200	135
1966	16,715	8,200	41,420	750
1965	10,855	5,920	31,610	-
1964	33,210	5,415	28,500	587
1963	49,800	3,400	29,250	395
1962	48,100	5,800	33,832	150

The first movement into the refuge this fall occurred the second week of September with the arrival of 1,000 mallards. There was a gradual build-up and the peak population was reached the second week of November, when over 64,000 ducks were using the refuge.

The third and fourth weeks of November saw an exodus occur and by December 1, the population had dropped to just over 6,000, by the last of December the population had decreased to 600.

4. Coots and Gallinules. On March 5, the coots were first observed. The peak spring population was estimated at 500 during the third week of April. The first week of May the population rose to 1,000. There was little or no production this year due to the dewatering of the pools in May. The fall population of coots peaked the first two weeks of November when 5,000 were present, but during the third week of November, not a single coot was observed.

   Common Gallinules. Only a total of 6 were observed at the peak population and this occurred the second week of May. No reproduction was observed.

5. Other Water Birds. The birds in this category spread their arrivals over long segments of time. The first Great Blue herons were observed on March 18, when two were sighted along the Shiawassee River. The refuge staff had a pleasant surprise when the heron rookery was found in May. We had been estimating a summer population of 50 but found the population to be approximately 200 before any reproduction.

   The first pied-billed grebes were sighted on April 6, horned grebe on April 15, sora rails on April 23, common loon on April 30. The first green heron was sighted on May 13, but was probably here before this time.

   The peak of the fall migration of black crowned night herons took place on August 28, when 16 were sighted in Pool 1A. A double crested comorant was sighted on October 19, and 6 common egrets on October 28.

6. Shorebirds, Gulls and Terns. Yellow-legs, dowitchers, killdeers, spotted sandpipers, and other "peeps" made their arrival on the refuge during the first half of April. Sightings of interest to the staff were 109 pectorial sandpipers, 10 Bonaparte's gulls and 20 spotted sandpipers on April 16. The first semipalmated plover and red-backed sandpipers were sighted in mid-May.

Herring gulls and ring-billed gulls are found in the area throughout the year but their number is greatest during the spring and periods of high wind on Lake Huron.

B. Upland Game Birds.

Ring-necked Pheasants showed an increase this year on the refuge. Three broods were sighted during the summer and several sightings this fall. The population was estimated to be 20, which is double last year's figure.

Morning Doves use the refuge throughout the year. The peak population occurred during September when an estimated 200 were using the refuge.

C. Big Game Animals

The White-tailed deer are found throughout the refuge and at the period of greatest use the population was estimated to number 535 head. The first fawn was sighted on May 10, and many were seen throughout the remainder of the summer. Twins and triplets were common.

D. Fur Animals, Predators, Rodents, and Other Mammals.

The Muskrat population decreased this year due to the spring floods and drying up of the pools. During the spring flood the rats were flooded out of their houses and bank dens by the high water. The nights were wet and cold, with the temperatures well below freezing many nights, and the rats were not able to withstand the elements and a high number died, apparently due to overexposure. Reproduction was reduced due to the draining of the pools in May. There is no trapping on the refuge for the 1971-72 season due to the low rat population.

Beaver. April of 1971, was the first time in many years that a beaver trapping season was held in the area of the refuge. Eight beavers were removed from the refuge by permittee trappers. There were three active beaver lodges and several other areas that showed high use but no lodges were located.

Mink and Weasel.numbers are assumed to be at the usual low level. There were two mink sightings this past spring. These were the first sightings in eight years.

Raccoon numbers dropped drastically. Out of approximately twelve sightings only one raccoon was healthy. The remainder appeared to have a very bad case of mange and were in the process of dying when sighted.

Skunks or their signs were not sighted at all in the past year. An increase in the population was indicated by the fact that the trappers caught six.

Red Fox populations showed a vast increase in the spring when five active dens were located in the center portion of the refuge. Throughout May and June fox pups could be sighted throughout the refuge. In July the pups and adults began to show the signs of some disease. Their eyes would discharge mucus and their coats became ragged and molted. One sick fox was sent to the State Research Lab, at Rose Lake. The Lab reported a severe case of mange.

E. Hawks, Eagles, Owls, and Crows.

Sparrow hawks and American rough-legged hawks are found on the refuge throughout the year and their numbers are usually lightest during the winter. The first turkey vulture and marsh hawk were observed on March 4, the past spring. Also, 10 rough-legged hawks were observed the same day.

Bald Eagles were sighted on the refuge from March through December. The greatest number at any one time was four (three immatures and one adult) on May 30. One golden eagle was first sighted on the refuge on March 27, and last sighted on April 6.

No ospreys were sighted in 1971.

Great Horned Owls, Short-eared Owls, Long-eared Owls and Screech Owls are residents of the refuge, although seldom seen, they are often heard in the evenings. Snowy owls made a late appearance for the winter of 1970-71, when the first one was observed on January 8, 1971. He was last seen during March. The first snowy owl sighted during the fall of 1971, was on October 28. This owl was making sure he arrived down south in plenty of time.

Crows are year-round residents of the refuge and the peak population of 100 is usually reached in March and September.

H. Reptiles and Amphibians.

No unusual observations during the year.

I. Disease.

The raccoon and red fox populations were drastically reduced by severe mange this past year. The diagnosis was made by a pathologists employed for the Michigan Department of Natural Resources.

J. Rare and Endangered Species.

None use the Shiawassee National Wildlife Refuge.

III. REFUGE DEVELOPMENT AND MAINTENANCE

A. Physical Development.

1. Contract work completed.

a. Contract work started last year by Fondessy Enterprises, Inc., of Oregon, Ohio, was completed early this fall. This work consisted of building 15,000 feet of dike, rebuilding 23,000 feet of existing dike and graveling 4½ miles of roads and dike tops, construction of one concrete water control structure, eight corrugated metal water control structures, three corrugated metal outlet structures, and the construction of three emergency spillways. We now have complete control of water in Pools 1 and 2, but still require near flood conditions to place water in pool 3. All trees on both sides of the Spaulding Drain were also cleared out under this contract. Hopefully, this will prevent future log jams from forming in the drain inside the refuge.

b. Contract for $12,500 was awarded the J. D. Armstrong Landscape Company of Fraser, Michigan, to mulch 7 miles of new dike. The mulch was applied mixed with an asphalt emulsion. It now appears that a good cover of mulch was maintained on the river sides of the dikes. (see 2b.)

2. Dikes and Ditches.

The refuge staff accomplished the following:

a. Approximately three-quarters of a mile of interior ditch in Farm Unit 5 was cleaned out to enable field tile to function properly.

b. All new dikes were seeded prior to mulching. Pool 2 dike was seeded to a mix of Ladino clover, brome grass and red fescue. Pool 1 dikes were seeded to a mix of brome grass, red fescue, rye grass, Ladino clover, alsike clover, and birdsfoot tri foil. The mixed seeds were applied at the rate of 18 lbs./acre. Although the dikes were seeded late in the fall, it appears that much of the seed germinated and will offer some dike protection.

c. Three-fourths of a mile of new dike around Pool 2 was mulched using a mulcher borrowed from Seney NWR. Approximately one-fourth mile of dike along Pool 1B was mulched by hand, prior to receiving Seney's mulcher.

3. Pools.

a. Goose nesting mounds were repaired and rebuilt in Pools 1A, 1B, and 2. The mounds were all seeded with Ladino clover and mulched by hand. Dry conditions through late summer and early fall prevented a good grass catch.

b. Trap sites at Pools 1A and 1B were redesigned and rebuilt. The sites were expanded in size to allow setting up two, 30' x 60' skirted nets at each site.

4. Trails.

a. A new, one-fourth mile nature trail was constructed at the Ferguson Bayou picnic area. The trail parallels Ferguson Bayou for a distance and offers views of Pool 1A. Construction consisted of clearing a right-of-way with chain saw, D-4 tractor, and seeding with Ladino clover. Signs will be installed during the coming year. This trail was designed to be used primarily by boaters using the picnic area.

b. A larger drain tube was installed at the nature trail ramp at Farm Unit 2A. This elevated the ramp and helped keep that portion of the trail from flooding. New 48-inch tubes have been acquired and will be installed at the ramp this coming year.

c. New station posts and signs were installed around the main nature trail. Four-by-four posts were set four feet deep, numbers routed, painted, and posts stained. There has been no indication of people vandalism to the new signs and posts but deer use a few of them for "buck rubs". Trails were periodically patrolled to remove fallen timber.

5. Roads.

a. All roads were graded as required.

b. All roads and trails used during deer season patrol work were mowed in October.

c. The bridge crossing the Birch Run Drain on Littlejohn Road was completely re-decked with bridge planks received from Seney NWR.

6. Fencing and Posting.

a. Refuge boundary signs were replaced as needed.

b. The entire refuge boundary was checked and posted prior to the hunting seasons. Before November 15, the area closed signs were placed around the area closed to deer hunting, with guns, and prior to December 1, hunting by permit only signs were placed around the entire refuge.

c. The Lake St. Clair Refuge and Wyandotte Refuge were posted prior to the opening of waterfowl season and the buoys were picked up after the close of the season.

d. Boundary fence was repaired throughout the year.

7. Miscellaneous Jobs.

The pump and pump motor for Farm Unit 5 was pulled and repaired. New blades and bearings were installed on the pump and the motor was cleaned and dried out. (It went under water during spring flooding.)

Numerous holes and low spots in dikes were filled.

Roll bars were installed on the D-4 tractor and the machine was cleaned and painted. Many hours were spent trying to keep old equipment operating.

An area around the main gate toilet buildings was dozed, graded and seeded in an attempt to make it more eye pleasing. Vandals periodically tore elaborate toilet paper dispensers off the walls of the buildings and threw them into the toilet vaults (much to the dismay of the student employee who fished them out). We are going to try our luck with so called "vandal proof" dispensers during the coming year.

Barriers were placed along the Nature Trail to prevent the public from wandering into the trap sites.

Routine maintenance of all buildings, grounds and motor vehicles occupied much of our time. All refuge furnaces were cleaned and repaired in the fall.

The student employees and NYC troops hauled 3,000 bales of straw. This straw was stockpiled in the refuge interior and used for dike and goose mound mulch.

Bouys and anchors for Lake St. Clair and Detroit River were constructed and repaired.

Goose hunting blinds were repaired, placed in the field, camouflaged with corn stalks, cleaned and removed following the close of the goose season. Large numbers of empty snake bite medicine containers around the blinds attested to the quality of the hunt.

B. Plantings.

1. Aquatic and Marsh Plants.

None.

2. Trees and Shrubs.

None.

3. Upland Herbaceous Plants.

None.

4. Cultivated Crops.

Eleven different crops were grown on 2,843 acres of refuge farm land. All farming was carried out under Cooperative Farming Agreements with 17 local farmers. The farmers furnished all materials and performed all the work in the farming program. Refuge crops and yields are summarized in the following tables and on the NR-8 forms. The eleven crops grown were soybeans, white beans, kidney beans, field corn, sorghum, sudex, barley, millet, wheat, buckwheat, and sugar beets.

SHIAWASSEE NATIONAL WILDLIFE REFUGE

REFUGE CROPS - 1971

CROP	TOTAL ACREAGE	% OF TOTAL	AVE. YIELD	AVE. VALUE
SOYBEANS	375	13.2	31.2	$100.86
WHITE BEANS	666	23.4	7.78	76.81
KIDNEY BEANS	90	3.2	6.13	61.20
CORN	738	26.0	70.04	65.30
SORGUM	10	.4	NOT HARVESTED	-
SUDEX	15	.5	NOT HARVESTED	-
BARLEY	167	5.9	45.2	36.16
MILLET	25	.9	NOT HARVESTED	-
WHEAT	186	6.5	58.9	31.97
BUCKWHEAT	500	17.6	NOT HARVESTED	-
SUGAR BEETS	71	2.4	25.6	287.56
TOTALS:	2,843	100.0	-	$ 95.69 (AVE)

CROP YIELDS - 1971

BUCKWHEAT

COOPERATOR	ACRES	BU/ACRES	AVE. VALUE
ALMY, I.	84	NOT HARVESTED	-
BENKERT BROTHERS	14	"	-
BOESE, M.	57	"	-
BOWDEN, S.	30	"	-
BREMER, G.	20	"	-
BEUNS, J.	22	"	-
FAWCETT, H.	27	"	-
GEMPEL, J.	10	"	-
GOSEN, C.	35	"	-
GOSEN, H.	18	"	-
HART, M.	34	"	-
PEARSON, A.	66	"	-
SCHREMS, G.	13	"	-
SCHRAMKE, C.	18	"	-
SCHLUCKEBIER, A.	52	"	-
TOTALS:	500	-	-

SUGAR BEETS

COOPERATOR	ACRES	TON/ACRE	$/ACRE
GOSEN, C.	26	25.0	NOT SOLD
PEARSON, A.	27	25.0	NOT SOLD
SCHRAMKE, C.	18	26.8	287.56
TOTALS:	71	25.6 Ave.	287.56 Ave.

CROP YIELDS - 1971

SOYBEANS

COOPERATOR	ACRES	BU/ACRE	$/ACRE
BOWDEN BROTHERS	43	24.6	72.82
BREMER, G.	20	42.0	125.16
GEMPEL, J.	34	29.3	NOT SOLD
GOSEN, C.	69	33.0	NOT SOLD
GOSEN, H.	48	40.0	118.40
HART, M.	46	26.6	NOT SOLD
PEARSON, A.	51	22.6	NOT SOLD
SCHREMS, G.	25	34.8	NOT SOLD
SCHRAMM, C.	17	32.4	93.64
WEIGL, R.	22	37.7	NOT SOLD
TOTALS:	375	31.2 Ave.	100.86 Ave.

WHITE BEANS

COOPERATOR	ACRES	CWT/ACRE	$/ACRE
ALMY, I.	147	7.77	NOT SOLD
BENKERT BROTHERS	27	2.40	27.51
BOESE, M.	106	NOT HARVESTED	-
BREMER, J.	80	10.54	90.84
BRUNS, J.	28	NOT HARVESTED	-
GOSEN, C.	44	8.17	NOT SOLD
HART, M.	46	7.37	NOT SOLD
PAGEL, C.	35	11.66	NOT SOLD
PEARSON, A.	10	12.24	NOT SOLD
SCHLUCKEBIER, A.	143	6.02	78.27
TOTALS:	666	7.78 Ave.	76.81 Ave.

CROP YIELDS - 1971

KIDNEY BEANS

COOPERATOR	ACRES	CWT/ACRES	$/ACRE
BOWDEN, S.	90	6.13	61.20
TOTALS:	99	6.13 Ave.	61.20 Ave.

CORN

COOPERATOR	ACRES	BU/ACRE	$/ACRE
ALMY, I	105	74.0	75.48
BOESE, M.	154	66.0	NOT SOLD
BREMER, G.	76	61.1	58.65
BRUNS, J.	1	NOT HARVESTED	-
FAWCETT, K.	40	75.0	NOT SOLD
GEMPEL, J.	7	NOT HARVESTED	-
GOSEN, C.	31	50.4	NOT SOLD
PEAPHON, A.	72	77.5	NOT SOLD
SCHRAMKE, C.	18	42.5	34.00
SCHLUCKEBIER, A.	234	75.4	NOT SOLD
TOTALS:	738	70.04 Ave.	65.30 Ave.

SORGUM

COOPERATOR	ACRES	BU/ACRE	$/ACRE
GOSEN, C.	10	NOT HARVESTED	-
TOTALS:	10		

CROP YIELDS - 1971

SUDEX

SORGHUM

COOPERATOR	ACRES	BU/ACRE	$/ACRE
GOSEN, C.	15	NOT HARVESTED	-
TOTALS:	15		

BARLEY

COOPERATOR	ACRES	BU/ACRE	$/ACRE
AIMY, I.	18	NOT HARVESTED	-
BOESE, M.	46	NOT HARVESTED	-
BOWDEN, S.	51	45.2	36.16
SCHLUCKEBIER, A.	52	NOT HARVESTED	-
TOTALS:	167	45.2 Ave.	36.16 Ave.

MILLET

COOPERATOR	ACRES	BU/ACRE	$/ACRE
GOSEN, C.	25	NOT HARVESTED	-
TOTALS:	25	-	-

WHEAT

COOPERATOR	ACRES	BU/ACRE	$/ACRE
BREMER, J.	45	45.6	37.12
FAWCETT, H.	32	NOT SOLD	
PAGEL, C.	35	76.0	25.35
PEAPHON, A.	64	59.0	NOT SOLD
WEIGL, R.	10	NOT HARVESTED	-
TOTALS:	186	58.9 Ave.	31.97 Ave.

Most field work on refuge croplands started in mid-April although some cooperators were delayed due to flooded conditions of the fields. Drought conditions from May on prevented bean crops from germinating and some fields had to be replanted. Many bean crops germinated late and some were left in the fields unharvested. Some of the late bean crops were fed on by early migrant geese. Corn suffered from the drought and was thin.

The refuge share of the 1971 corn that was left in the fields consisted of 98 acres of field corn, 10 acres of sorghum, 15 acres of sudex, 146 acres of barley, 25 acres of millet, 10 acres of wheat, 500 acres of buckwheat, and 13 acres of sugar beets. Seventy-seven acres of the refuge share of corn was harvested and gave a yield of 3,005 bushels. At the end of the year we had 234 bushels of corn stored at a local elevator for transfer to Seney Refuge, and 1,444 bushels at the refuge grainery. Transfer of 1,147 bushels of corn was made to the Ottawa and Seney Refuges during the year.

Winter wheat and rye were planted as green cover crops after the harvest on 1,069 acres of refuge farm land. This cover crop provides browse, prevents erosion, and serves as green manure in the spring, adding humus to the soil.

C. Collection and Receipts.

1. Animal Specimens. Two great blue herons for pesticide analysis.

2. Refuge Herbarium. No plants were added to the collection.

D. Control of Vegetation.

Control of weeds in the crop fields was done by the cooperating farmers. The chemicals used in this program were approved by the Regional Office.

The refuge staff sprayed 117 acres of dike slopes with 2,4-D to control willow and Canada thistle. The staff also used mechanical weed control which consisted of mowing road edges, dike tops and field borders several times during the summer.

E. Planned Burning. None

F. Fires. None

IV. RESOURCE MANAGEMENT

A. Grazing.

None.

B. Haying.

None.

C. Fur Harvest.

The staff felt that there should be no trapping on the refuge during the 1971-72 trapping season. Due to the fact that the muskrat population had decreased when the pools were drained for construction work and most other trappable species had decreased in number due to mange.

The general 1970-71 Michigan trapping season opened on November 15, 1970, and closed March 31, 1971. A special beaver season was opened in April. There were three permittee trappers for the 1970-71 season and they harvested 6 skunk, 7 raccoon, 13 oppossum, 32 red fox, and 929 muskrats. During the special beaver season they removed 8 beaver from the refuge. The trappers received a total of $1,304.15, for the muskrat and beaver pelts of which $529.06 was the share for the refuge.

V. FIELD INVESTIGATION OR APPLIED RESEARCH

A. Whistling Swans.

The formal wildlife management study was completed in the spring of 1968, and the formal report has been submitted. The refuge has been cooperating with Dr. William Sladen of Johns Hopkins University who has been studying the swans. We were unable to trap any swans this past spring due to flood conditions.

B. Marsh Transect Surveys.

No transects were run this past summer due to dike construction and habitat renovation in the pool areas.

C. Banding.

During the spring migration, 11 adult Canada geese were banded. The goslings were drive trapped during the summer and 176 were banded.

No local ducks were banded during the summer due to poor trapping conditions resulting from the construction work. The fall quota of 500 preseason mallards was not reached. In fact, no mallards were banded at all. During the only week that mallards were available on the trap sites the Manager and the Assistants were at a PPBE workshop.

There was a special project to determine the distribution and identity of the Tennessee Valley population of Canada geese in their southerly migration to the wintering areas. There was a quota of 2,000 Canada geese to be banded at Shiawassee with one-half (1,000) to be color marked. Area Biologist Gerald E. Cummings spearheaded the project at this refuge.

Following is a table showing the number of birds banded and painted, and just banded. The hunting season was divided into four periods and 250 birds were to be banded and another 250 to be banded and painted each period.

	Colored & Banded	Banded
October 1-11	255 White	300
October 12-22	250 Red	249
October 23 - November 5	231 Yellow/Green	-
November 6-16	257 Orange	16
	993	565

Assistance was received from the Michigan Department of Natural Resources with the painting portion of the project. Mr. Cummings and refuge personnel did all of the net trapping. Once the birds had been trapped they were hauled by trailer to the refuge corn crib. Banding and painting was carried out at the corn crib.

The birds which were to be color marked had the upper surface of their wings painted. The paint used was a quick drying lacquer mixed 50/50 with quick dry lacquer thinner. The major problem encountered was the clogging of the spray gun used in the application of the paint. This problem was corrected by taking the gun apart and placing the parts in a container of "gum cleaning solution" overnight.

We were unable to reach our quota of 2,000 geese. The geese began the feed in the harvested corn fields during the last two periods of the project.

D. Sugar Beet Utilization by Canada Geese.

The objectives of this study are to determine use patterns and food values received by wildlife, primarily Canada geese, from sugar beets. The growing practices and harvesting of sugar beets were also to be studied; especially any facts which appeared to be detrimental to the refuge.

This year we hoped to learn the answer to two questions. One, if the growing of beets in Farm Unit 1 was the main attraction and if geese would eat untopped beets.

This year no beets were grown in Farm Unit 1, which is located in the center of the refuge and the area which receives the greatest amount of use by geese. Three fields of beets (total of 61 acres) were planted in the outlying areas this year. The refuge took 11 acres as our share, of which one acre was untopped.

No goose-use of any beet fields was observed this past fall. This includes fields on private land in the area also. It is open to some conjector as to why the beets received no use this year. The refuge staff feels that location of the beet fields is one of the primary factors in determining use and since no beets were grown in Farm Unit 1, it follows that there would be little or no use. The foregoing statement is based on our observations in the past year compared to recorded observations in the preceeding years. One must make note of the fact that total goose-use days for this past fall were at least 500,000 lower than in the past two years. Perhaps the lower numbers influence goose behavior and in higher numbers geese seek out beets. Shortage of food does not appear to be one of the determining factors of beet utilization now or in the past.

Although this study has left unanswered questions concerning geese and sugar beet use it has been recommended to the Regional Office that sugar beets no longer be grown on this refuge. Mainly because of the lack of goose-use during the past three years, the damage done to patrol roads by beet harvesting equipment and the safety hazard to refuge visitors by the trucks hauling beets out of the main gate of the refuge.

VI. PUBLIC RELATIONS

A. Recreational Use.

Recreation use of the refuge dropped from 25,434 visits in 1970 to 16,950 in 1971. This was attributed to two main factors. High water and construction. Spring auto tours had to be cancelled because of poor refuge road conditions due to spring flooding. High water also closed the nature trail until early April. Construction activities on the refuge also excluded guided auto tours late in the spring because of safety factors. It was also necessary to close the nature trail for a period of time while construction work was being accomplished on the dikes at the beginning of the trail. Hopefully, in 1972, we will be back into the swing of things and be able to better provide the public opportunities to visit the refuge.

B. Refuge Visitors.

Visitors to the refuge included personnel from the Regional Office, news media, local universities, refuges, Michigan Department of Natural Resources, and from local clubs and Organizations. Frequent visitors included John Ramsour, R.O. Engineer, Game Management Agent Bill Fuchs, Agent John Cross, and State Conservation Officers Bill Murphy, John Harris and Ray Ankney.

C. Refuge Participation.

1. Refuge Tours.

April	5	- Alma College Ornithology Class (Bober - 18)
	15	- Alma College Conservation Class (Bober -20)
	29	MacGregor Intermediate School (Bober - 24)

2. Meetings.

January	20	- Farm Cooperator meeting at the refuge (Frye, Evans & Bober - 20)
April	1	- Boy Scouts of America SOAR meeting, Birch Run (Bober - 40)

April	12	-	Agriculture Council Meeting (Frye)
May	5	-	Saginaw Field and Stream Club Directors (Frye, Evans & Bober - 30)
August	10	-	North Central Field Committee, Ann Arbor (Evans)

3. Slide Talks.

January	6	-	Shiawassee Shrine Club, Owasso (Frye - 43)
	21	-	Film "So Little Time". Birch Run 6th grade class (Bober - 93)
February	2	-	Holy Cross Church (Bober - 30)
	10	-	Saginaw County Fire Association (Bober - 115)
	11	-	Boy Scout Round Table (Poma - 25)
	22	-	University of Michigan Seminar (Frye - 24)
March	3	-	Shields Lions Club Dinner (Frye - 31)
	11	-	Boy Scouts Troop 312 (Poma - 34)
	15	-	Film "So Little Time". Boy Scouts Troop 386 (Poma - 118)
	22	-	Arthur Hill High School Nature Club (Frye - 110)
April	13	-	Hemlock Lions Club (Frye - 24)
	20		Film. Handley School (Evans - 60)

April	23	-	St. Thomas School (Bober - 120)
	26	-	Film. Birch Run Boy Scout Troop (Bober - 20)
May	25	-	St. Thomas School Career Day (Evans - 20)
	26	-	Albee Elementary School (Poma - 80)
August	3	-	Boy Scouts SOAR (Bober - 20)
	10	-	North Central Field Committee (Evans - 20)
October	12	-	Michigan State Waterfowl Class (Timmerman & Johnson (DNR) - 45)
	13	-	Saginaw Shrine Club (Evans - 150)
	18	-	Hemlock School Conservation Class (Evans - 35)
December	15	-	Saginaw Valley Auto Parts Dealer Association (Evans - 280)
	29	-	Midland Shrine Club (Evans - 35)

4. Student Interviews.

John R. Frye and John Wilbrecht, Manager at Seney Refuge, conducted student interviews with college Juniors and Seniors at the University of Michigan and Michigan State University on February 24 through 25.

5. Radio and Television.

April	7	-	WKNX. Two-minute taped interview. Two presented on Shiawassee Refuge (Bober)

April	13 -	Major TV stations through Michigan. A 5-minute color film "Michigan Sportsman" was presented on waterfowl concentrations at the Shiawassee Refuge.
September	7 -	Channel 5 and 12. News release on goose hunting permit application and on December Bow Hunting regulations on Shiawassee Refuge.
	30 -	Michigan TV stations. Color film "Michigan Outdoors".

D. Hunting.

1. Managed Goose Hunting.

Shiawassee Refuge had managed goose hunting in outlying areas of the refuge in 1971. Special regulations were established for the Saginaw Goose Management Area again this year by the State of Michigan. The management area encompasses approximately 66,000 acres including the refuge and the State Game Area. Under the special regulations the goose hunting season opened on October 1 and ended on November 14; hunting was limited to one-half days, from opening hour until noon, and daily bag and possession limit was two Canada geese. Goose hunting only was permitted on refuge public hunting areas while both geese and ducks could be taken on private lands and on the State Game Area.

Forty blinds, 15 pit and 25 wooden temporary, were provided with a maximum of three hunters per blind per day for the 43-day season.

All blinds were assigned through advance mail applications as in the previous years, whereby the successful applicants would be guaranteed a blind reservation for the date specified by them on their application.

Applications were made available to interested hunters in mid-August and had to be postmarked by September 15, to be eligible. All applications were sorted and filed. We received 2,145 valid applications for a total of 1,720 possible reservations.

MICHIGAN
DEPARTMENT OF NATURAL RESOURCES

SAGINAW COUNTY GOOSE MANAGEMENT AREA

Scale:
0 1 2 3 Miles

MAP - 2148
1971

SAGINAW COUNTY GOOSE MANAGEMENT AREA

The Shiawassee River and State Game Area and Shiawassee National Wildlife Refuge are located south and west of the city of Saginaw and form the core of the Saginaw County goose management area. Seventeen thousand acres of public-owned land is dedicated for waterfowl management to provide a major resting and feeding area for migrating ducks and geese. Agricultural crops are produced on a co-operative basis with local landowners on both federal and state-owned land.

The management area includes that portion of Saginaw County enclosed by M-13 on the east; M-46 on the north; M-52 on the west; and Fergus, Bueche, and Verne Roads on the south. All private lands within these boundaries have the same hunting restrictions as public lands. The special hunting rules within the management zone include all private lands as well as public lands.

This area was closed to goose hunting from 1964 through 1966 to give the resident Canada goose flock an opportunity to become established. However, duck hunting was allowed.

"Managed Hunting Units" on both State and Federal Lands have been in operation since 1967. Hunter numbers, a noon closing, and closed areas restrict gunning pressure on resident goose population and assure quality hunting. All hunters must have a current Michigan small game license and duck stamp. Hunters interested in applying for hunting permits on public lands should contact or write to the following stations:

SHIAWASSEE NATIONAL WILDLIFE REFUGE

Refuge Headquarters are 6 miles south of the city of Saginaw, one half mile west of Michigan Highway 13 at Intersection of Mower and Curtis Roads. For information, contact: Refuge Manager, Shiawassee National Wildlife Refuge, 6975 Mower Road, Saginaw, Michigan 48601. Phone: 793-2340, Ext. 431 in Saginaw.

Hunters must apply in advance by mail for goose hunting on refuge managed areas. A drawing is held to determine successful applicants, who are then notified by mail that a blind will be available on the date they applied for. No duck hunting allowed on the refuge. Parties of two or three may apply for permits. There is a daily hunting fee of $2.00 per hunter.

SHIAWASSEE RIVER STATE GAME AREA

Headquarters is located in the city of St. Charles just north of Bad River Bridge on M-52. Personnel will answer your questions on hunting on the game area. For further information, contact: Biologist In Charge, Shiawassee River State Game Area, 225 E. Spruce Street. St. Charles, Michigan. Phone: St. Charles 517-865-2041.

The Dept. of Natural Resources holds a drawing each morning at St. Charles during the waterfowl hunting season at 5:00 a.m. in October, and 5:30 a.m. in November, with all parties present at that hour having an equal chance to secure a permit for morning duck and goose hunting. A similar drawing will be held at 11:00 a.m. to determine afternoon duck hunting positions. There is no charge for permits on state land. During the open waterfowl season, it is unlawful to enter the "Managed Hunting Unit" without a permit. Other portions of State Game Area are open to hunting without permits. Check with the St. Charles office for details.

SAGINAW COUNTY GOOSE MANAGEMENT AREA - SPECIAL RESTRICTIONS

1. Daily & possession limit of two Canada geese per hunter.
2. Noon closing for geese within the goose management area. This includes all private land.
3. Goose hunting closes on November 14 within the goose management area.

Drawings to determine successful applicants for blind reservations were completed on September 15, and validated reservations were mailed out to 169 different towns and cities in southern Michigan.

General procedures for the daily operation of the program were essentially the same as in previous years. Hunters with blind reservations were checked in, blinds assigned by luck of the draw, fees collected, and then hunters were directed to their assigned blinds. Any blinds not filled by reservation were assigned to stand-by hunters. Stand-by hunters signed in on a stand-by list, one hunting party per line. One hour before shooting time the blinds not filled by reservation were filled through a drawing. Numbered balls corresponding to the vacant blinds were placed in a can, along with enough blank balls to make up the total number of parties on the list. A member of each party was called to draw. Using this method each party had an equal chance to draw a vacant blind. The selection method was accepted by all. On most days in the early part of the season the blinds were all filled by reservation and stand-by hunters. Towards the end of the season, with word of the poor hunting spreading, vacant blinds were common. During the last two weeks of the season five of the poorest blinds were withdrawn from the drawing unless wanted by the stand-by hunters.

During the course of the season, 3,789 hunters participated in the Bureau's program. Seventy-eight per cent hunted by reservation and 12 per cent hunted stand-by.

The State managed goose hunting on Bureau lands located west of the Flint River and north of the Shiawassee River. This is the third year the State administered hunting on lands difficult to administer through the refuge hunting program, primarily because public access to the two areas is only through State lands. Six pit and four blinds installed on Bureau lands and operated by the State were used by 649 hunters.

A total of 606 geese were taken from refuge managed hunting areas in 1971, with 460 taken from Bureau operated blinds and 146 taken from the pits and blinds operated by the State. Of the 606 geese taken, 605 were Canada geese and one was a snow goose.

Age data from 407 Canada geese checked indicated that 40.8 per cent of the Canada geese taken were immature birds. Included in the 407 Canada geese taken were 65 immature males (16.0%), 105 immature females (24.8%), 130 mature males (31.9%), and 111 mature females (27.3%).

The overall hunter success ratio for the season was 13.7%. This corresponds to a success ratio of 26.9% in 1970, 10.3% in 1969, 3.1% in 1968, and 10.4% in 1967. Some dissatisfaction was expressed by the hunters (those that did not kill any geese) in the poor hunting this year as compared to the 1970 season. A partial reason for the lower hunting success ratio may be attributed to the lower number of birds coming through the refuge this fall.

Total receipts from the hunting program this year was $8,832. This is the total of $7,578 for hunter fees and $1,254 collected for rental of goose decoys.

The chart below shows goose hunting participation and hunter success ratios for goose seasons 1967-1971.

Goose Hunting Seasons 1967-1971

Year	Number Blinds Hunted	Number Hunters	Kill	Hunter Success Ratio
1967	20	1,063	111	10.4%
1968	25	947	29	3.1%
1969	*35	** 1,653	170	10.3%
1970	*50	** 3,218	866	26.9%
1971	*50	** 4,438	606	13.7%

* 10 blinds on Bureau lands operated by State
** Includes hunters using Bureau blinds operated by State.

2. Deer Hunting.

The firearms deer hunting season extended from November 15 through November 30, and firearms were limited to shotguns in this part of the State. As last year, all refuge land east of the Spaulding Drain and north of the Shiawassee River was open for shotgun only hunting. There were 100 doe permits issued for State Zone 74 in which the refuge is a part. It was estimated, from car counts, that 3,770 hunters visited the refuge during the 16-day season, with a legal kill of 30 bucks and 15 antlerless deer. The illegal kill was 20 deer.

The total acreage of the refuge was again open to bow and arrow deer hunting during Michigan's late archery season, December 1 through December 31. Again the first half of December was divided into two permit periods. The

SHIAWASSEE NATIONAL WILDLIFE REFUGE
6975 MOWER ROAD
SAGINAW, MICHIGAN 48601

BOW AND ARROW DEER HUNTING - 1971

A FEDERAL PERMIT WILL BE REQUIRED TO HUNT ON REFUGE LANDS FROM DECEMBER 1, THROUGH DECEMBER 15, 1971. NO PERMIT WILL BE REQUIRED FROM DECEMBER 16 THROUGH DECEMBER 31, 1971.

THERE WILL BE TWO (2) PERMIT PERIODS: DECEMBER 1 - 7; AND DECEMBER 8 - 15.

HOW TO APPLY FOR THE PERMIT:

1. APPLICATION FORM MUST BE A U. S. GOVERNMENT POST CARD. ONLY ONE APPLICATION PER HUNTER.
2. ON THE BLANK, BACK SIDE OF THE CARD, PRINT IN THE UPPER LEFT HAND CORNER YOUR CHOICE OF HUNTING PERIOD, EITHER DECEMBER 1 - 7, OR DECEMBER 8 - 15, AND YOUR 1971 MICHIGAN BOW HUNTING LICENSE NUMBER.
3. ON THE POSTAGE SIDE OF THE CARD PRINT YOUR NAME AND ADDRESS SO THE CARD CAN BE RETURNED TO YOU.
4. PUT THE CARD IN AN ENVELOPE AND MAIL TO:

   SHIAWASSEE NATIONAL WILDLIFE REFUGE
   6975 MOWER ROAD
   SAGINAW, MICHIGAN 48601

IMPORTANT: APPLICATIONS MUST BE RECEIVED AT THE REFUGE OFFICE ON OR BEFORE OCTOBER 31, 1971 TO BE ELIGIBLE FOR THE DRAWING TO BE HELD TO SELECT THE SUCCESSFUL APPLICANTS.

first period ran from December 1-7, and the second period ran from December 8-15. Notice was released to all news media during the last week of August that bow hunters could apply for a permit to hunt refuge lands from December 1-7, or December 8-15, by mailing a self addressed postcard to the refuge office, indicating hunting period desired and bow hunting license number. All cards had to be post marked by September 15, and 500 cards were to be drawn for each period. The postcard was validated by a stamp and served as the permit and was valid for the period indicated. The drawing was conducted on September 17, and 500 cards for the first period and 225 cards for the second period were stamped for validation and mailed back to the applicants. The remaining 969 cards were stamped to indicate they were unsuccessful and were mailed back to the applicants.

An estimated 1850 bow hunter visits were expended on bow hunting for the entire bow season. Seventy deer were taken by bow hunters; 58% or 41 being does and 41% or 29 being bucks.

It was necessary for the staff to contribute in excess of 1000 hours of time during the fall to manage the hunting and goose banding and color marking program. Needless to say, some program changes are in order if we are to continue with our present staff level. It was a pleasant relief when the hunting programs were over and the PPBS material was completed.

E. Violations.

The following violations were handled through Federal court:

Name	Violation	Court Action	
Warner, David Scott	Trespass	$25.00	Fine
Murdock, Daniel Lee	"	"	"
Kernstock, Leo Frank	"	"	"
Gehreke, Mark E.	"	"	"
Hess, David Richard	"	"	"
Jewell, James Henry	"	"	"
Terry, Gregory Wayne	"	"	"
Anorzejewski, Ronard Peter	"	"	"
Micharak, Thomas Roy	"	"	"
Miles, Donald Craig	"	"	"

Name	Violation	Court Action
Naylor, Michael Ray	Illegal Hunting	$50.00 fine
Crittenden, Galen Boyd	" "	" "
Martindale, F.	" "	" "
Crawford, John D.	" "	" "
Crawford, Douglas James	" "	" "
Newvine, Robert H.	" "	" "
Newvine, Jay E.	" "	" "
Horb, Thomas H.	" "	$25.00 "
Haynes, Thomas Alan	" "	" "
Jacobs, Justis J.	" "	" "
Cannady, Robert L.	" "	" "
Boggs, Willie J.	" "	" "
Rivett, Gerald	" "	$50.00 "
Rivett, Robert J.	" "	" "
	No Permit	
Webber, John F.	"	" "
Malisquist, Harold C.	"	" "
Dyer, James Lawrence	"	" "
Galarno, Francis Paul	"	" "
	Vehicular Trespass	
Shaner, Darrell David	" "	$25.00 "
Lawry, Dale L.	" "	" "
Schmidt, Herbert W.	No Waterfowl Stamp	$50.00 "
Hampton, Doyle K.	Shooting Early	" "

The following violations were handled through State court:

Lown, George J.	Shooting Illegal Deer	$107.00 fine
Lampley, Thomas Charles	Hunting Squirrels	$10.18 "
Douglass, Gilbert	Hunting Squirrels	$10.18 "

F. Safety.

During the year regular staff safety meetings were held with presentations rotated among personnel as follows:

January - Review of 1970 safety program (Frye)
February - Safety with heavy equipment (Blazo)
March - Review of station plan (Bober)
April - Safety around cannon nets (Evans)
May - Defensive Driving refresher (Poma and Frye)
June - Safe driving (Shelley)
July - Chapter 4 of Safety Manual (Bober)
August - Safety in everyday work (Blazo)
September - Safe use of hand tools (Evans)

No lost time accidents were recorded on the station during 1971. The station safety record stood at 660 days at the end of the year.

VII. OTHER ITEMS

A. Personnel.

Gary A. Evans entered on duty as Assistant Refuge Manager on January 25, 1971. Gary is a 1965 graduate of Utah State University, with a degree in Wildlife Management. He came to Shiawassee from the Bureau of Outdoor Recreation's Regional Office in Ann Arbor, Michigan. Prior to that he was with the Division of River Basin Studies, BSFW, on Long Island, New York, a Research Ecologists with the University of Utah at Dugway, Utah, and a veteran of seven years with the Air Force.

Manager John (Jack) Frye transferred to the Ottawa Refuge in August. Jack served as Manager of this station for eight years and saw the refuge go through many stages of development. He served on the local boy scout committee and was an active member in the local volunteer fireman's association during much of the time he was here. Prior to Jack's transfer he was promoted to a GS-12. Jack and Elain became proud grandparents during the year when their oldest daughter Kathy and her husband, Terry, were blessed with a daughter. Jack and his family will be missed by his many friends and associates in the Saginaw Valley.

Refuge Manager Robert H. Timmerman, his wife Carol, three children, and two horses, transferred in from Swan Lake Refuge in August to take over the helm. Bob has been stationed at Swan Lake for eight years and was happy to get his oldest son Ken near the old Alma Mater, the University of Michigan.

Sam Poma, the only Refuge Clerk assigned to this station since it was established in 1953, was transferred to the DeSota Refuge in November. Sam started out here in August 1954, so he was in on the ground floor, went through all phases of acquisition and development, and saw many personnel changes. His knowledge and experience will be missed and his past endeavors at this station have been greatly appreciated by those who have served with him. Sam's position was not filled at the end of the year.

Richard Papasso, Junior at Colorado State University, and hailing from New Jersey, and Myron Swenson, Graduate Student from Iowa State, were summer employees at the refuge. Rich stayed on until the end of November to help manage and to gain experience in the hunting programs. He was very valuable and

capable in the hunting, banding and color marking programs. While he was here he became engaged to a native girl and the wedding date was set for July 1972.

B. Photography.

Photos were taken with refuge and private equipment and processed in the office bathroom (goose and gander rest station since arrival of our new clerk on January 13, 1972).

C. Credits.

Sections I, II, VI, and VII were prepared by Gary Evans. Sections II, IV, and V were prepared by Gaylord Bober. The typing and assembly were done by our new clerk Janis Turner, whom we will tell you about next year.

SIGNATURE PAGE

Submitted by:

Gary A. Evans
(Signature)
Gary A. Evans

Assistant Refuge Manager
Title

Date: _____

Approved, Regional Office:

Date: APR 12 1972

James B. Monnie
(Signature)

ASST

Regional Refuge Supervisor

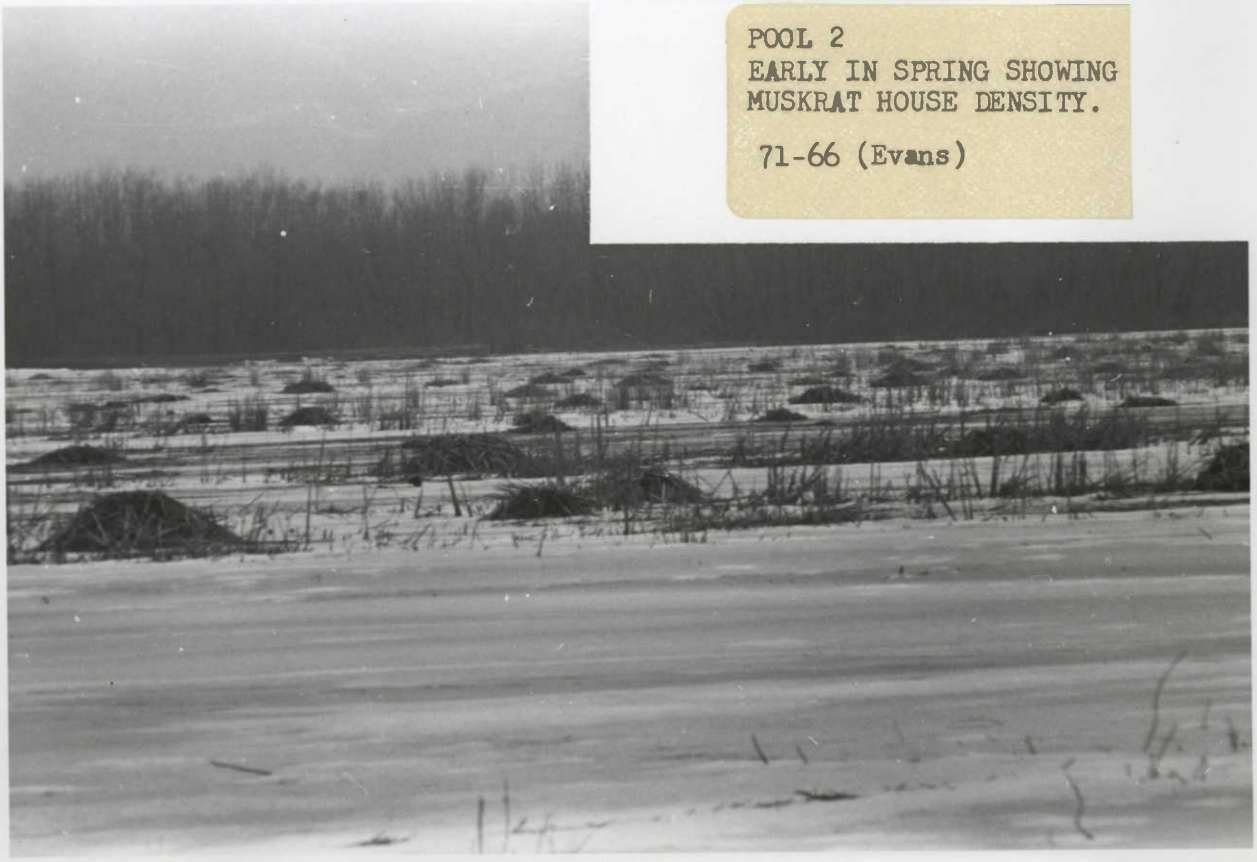
Approved by:

Robert H. Timmerman
Robert H. Timmerman
Refuge Manager

Crew at end of the year. From Left to Right: Asst. Manager Gaylord Bober, Manager Robert Timmerman, Equipment Oper. Larry Blazo, Equipment Oper. Kenneth Shelley, Asst. Manager Gary Evans. 71-65A

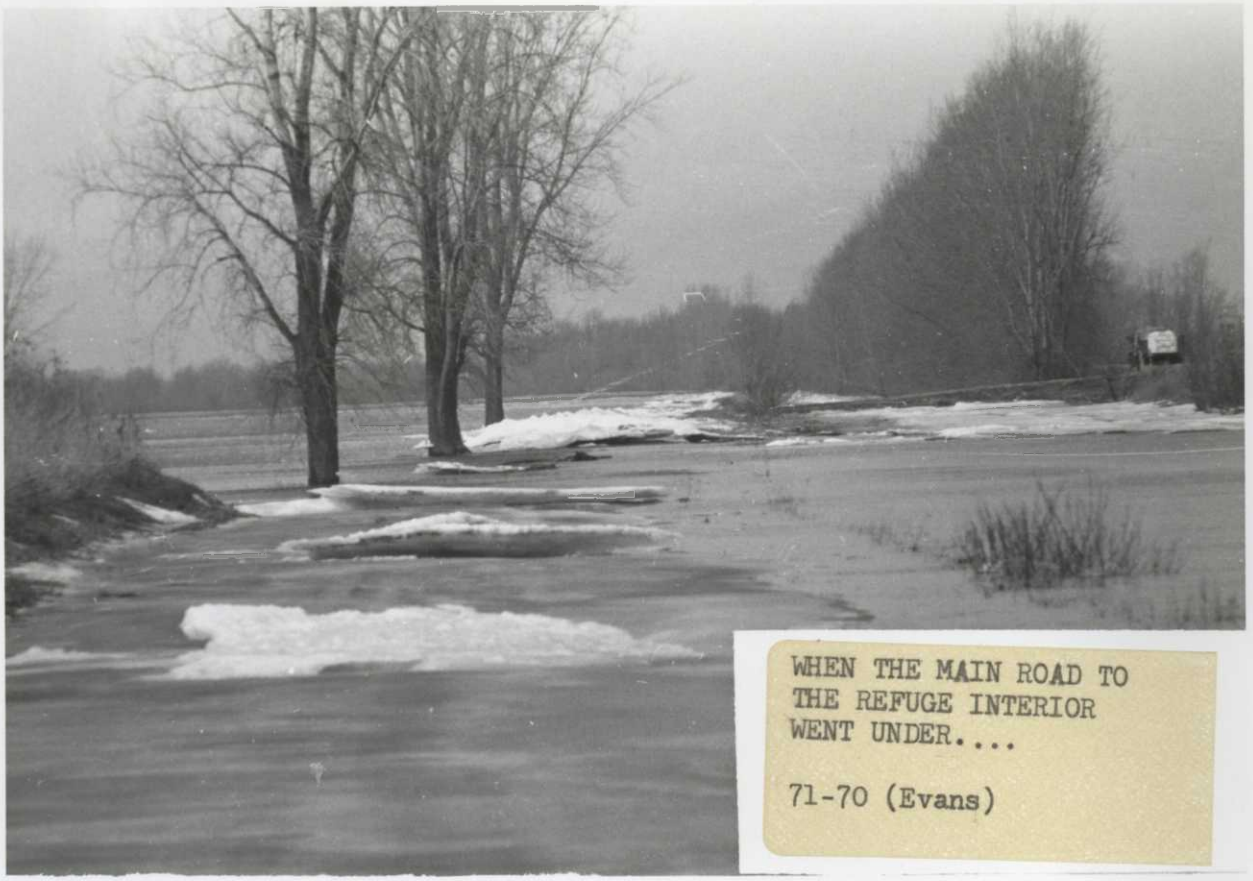
EARLY MIGRANTS

71-84 (Evans)



POOL 2
EARLY IN SPRING SHOWING
MUSKRAT HOUSE DENSITY.

71-66 (Evans)

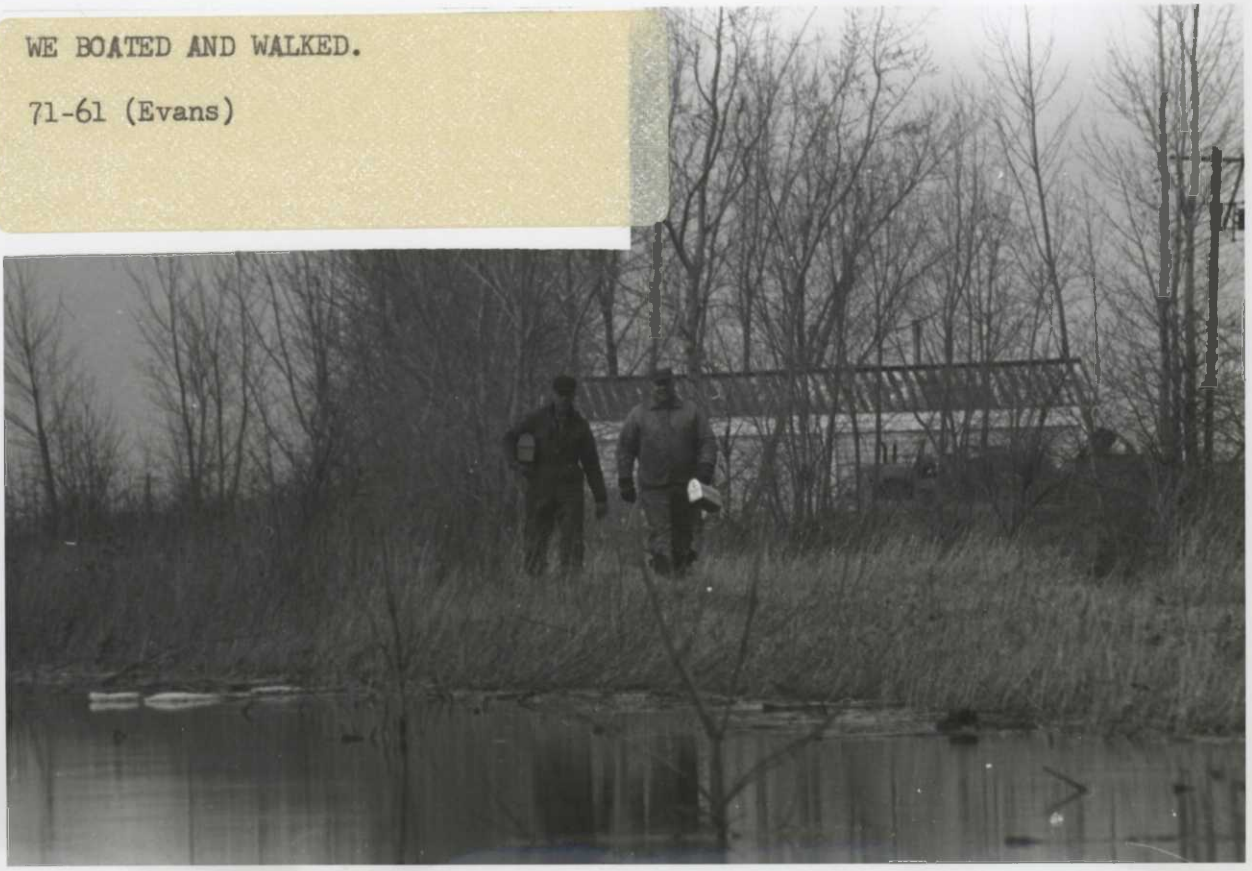


WHEN THE MAIN ROAD TO
THE REFUGE INTERIOR
WENT UNDER....

71-70 (Evans)

WE BOATED AND WALKED.

71-61 (Evans)



TREE REMOVAL ALONG BOTH SIDES OF THE SPAULDING DRAIN WITHIN REFUGE BOUNDARY. LOOKING SOUTH
11710117 (Winship)

POOL 1A SHOWING NEW DIKES AND RECONSTRUCTED GOOSE NESTING ISLANDS. SHIAWASSEE RIVER ON THE LEFT. LOOKING EAST.
11710107 (Winship)

WEST END OF POOL 2, SHOWING NEW DIKE AND NESTING MOUNDS. LOOKING SOUTH. FLINT RIVER ON RIGHT.
11710110 (Winship)

NEW DIKES AND SPILLWAY, POOL 2.
LOOKING SOUTH. SHIAWASSEE RIVER
AT BOTTOM. 11710109 (Winship)

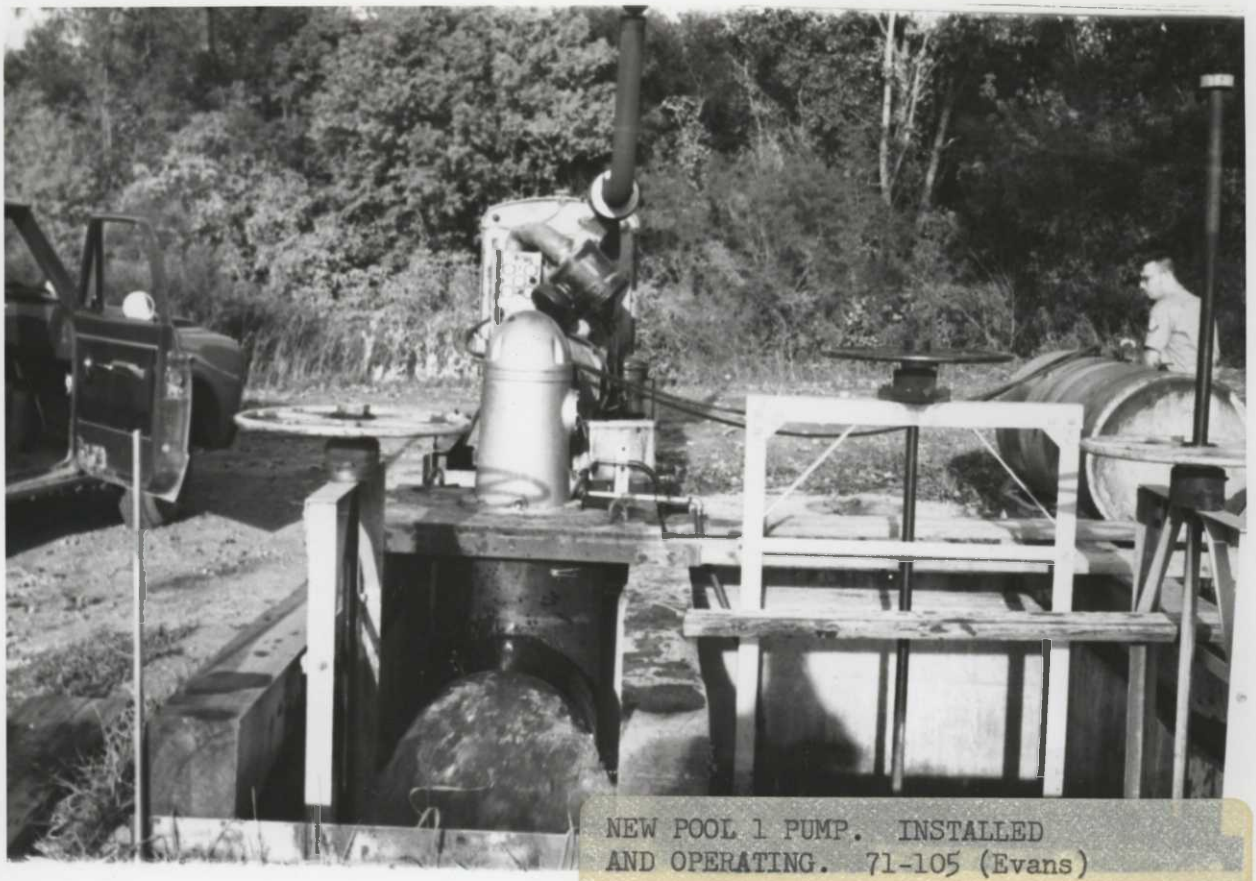
POOL 2 SHOWING NEW SOUTH DIKE AND RECONSTRUCTED GOOSE NESTING ISLANDS. LOOKING EAST. FLINT RIVER AT BOTTOM. 11710112 (Winship)

NEW WATER CONTROL STRUCTURES, POOL 1B. POOL 1B IS ON LEFT AND THE FERGUSON BAYOU IS IN THE CENTER. LOOKING NORTH. 11710103 (Winship)

NEW BARTELL ROAD DIKE AND
SECONDARY HEADQUARTERS PAD
ON LEFT. LOOKING WEST.
11710115 (Winship)

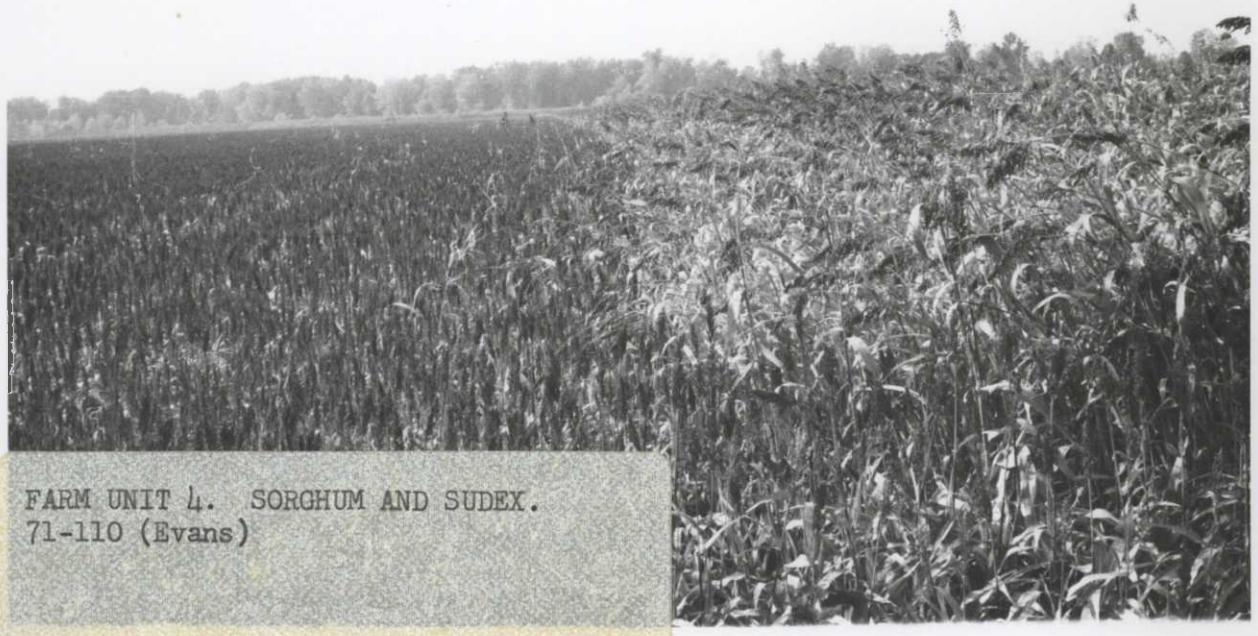
NEW BARTELL ROAD DIKE SHOWING VEHICULAR TRESPASS DAMAGE. CULPRIT LEFT HIS LICENSE PLATE SO WAS CAUGHT. 71-98 (Evans)

OUR TRAIL LEAFLET DISPENSER RECEIVED SOME UNDESIRABLE USE. A NEW DISPENSER IS BEING DESIGNED AND CONSTRUCTED. 71-108 (Evans)

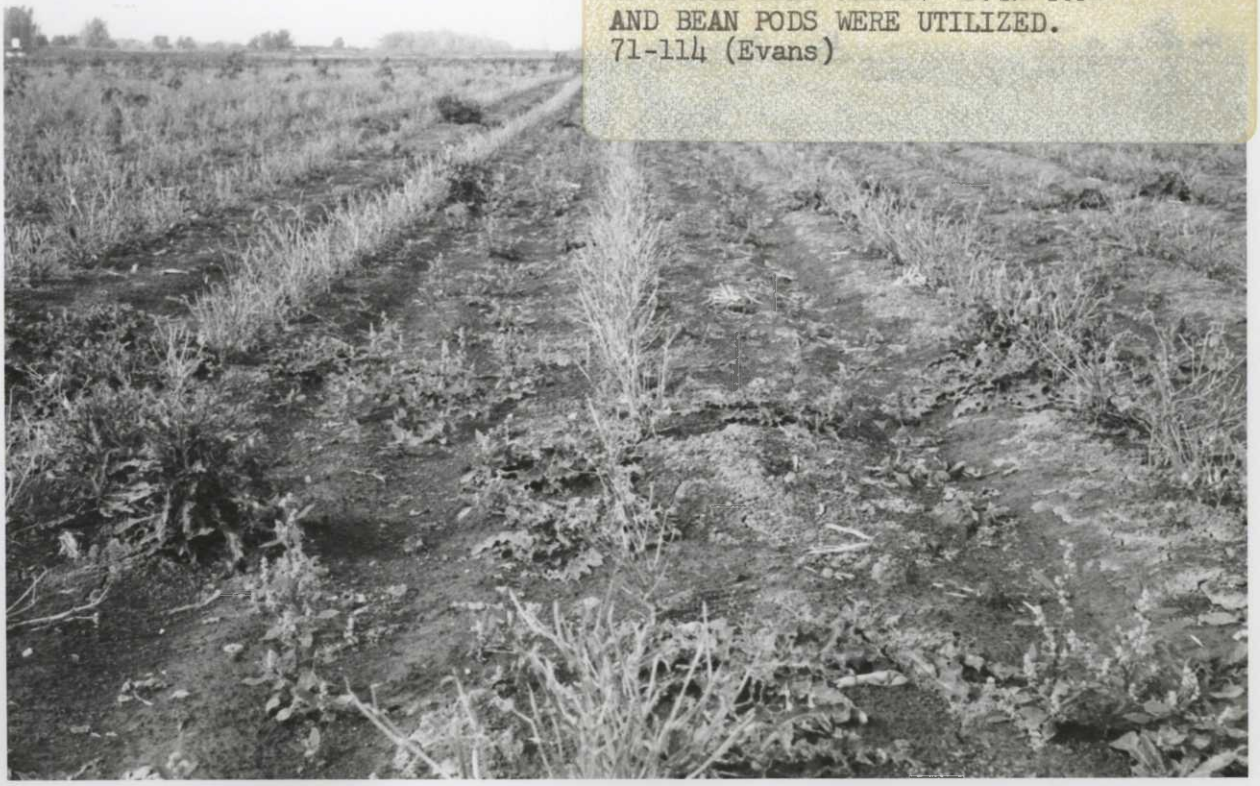


NEW POOL 1 PUMP. INSTALLED AND OPERATING. 71-105 (Evans)

NEW LOW LEVEL DIKE BETWEEN POOLS 1A and 1B. 71-117 (Evans)

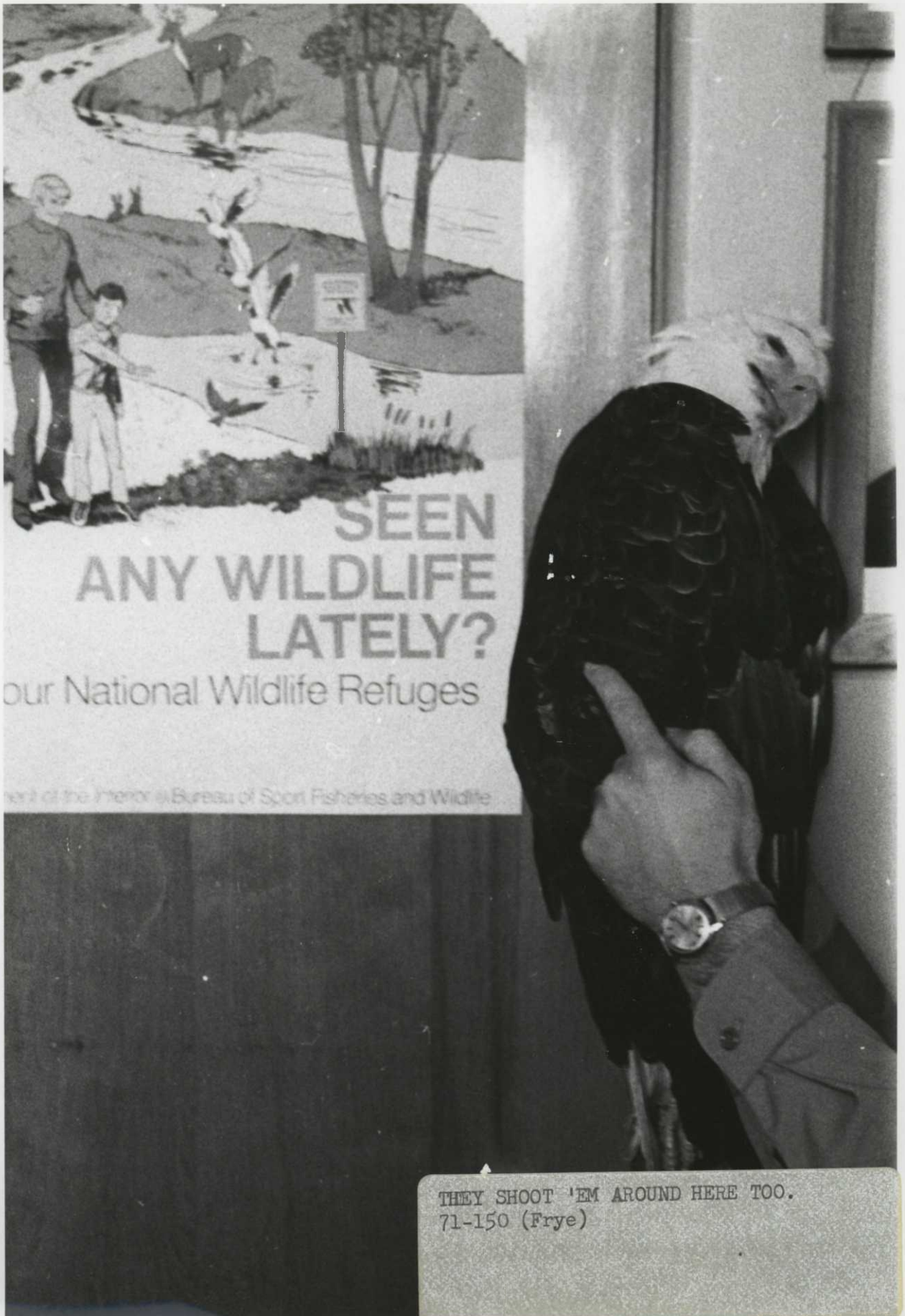


FARM UNIT 4. SORGHUM AND SUDEX.
71-110 (Evans)



FARM UNIT 1B SHOWING GOOSE DAMAGE TO WHITE BEAN CROPS. BOTH TOPS AND BEAN PODS WERE UTILIZED.
71-114 (Evans)

A PORTION OF OUR BLUE HERON ROOKERY. 71-22 (Frye)



THEY SHOOT 'EM AROUND HERE TOO.
71-150 (Frye)

COLOR MARKING PROGRAM IN FULL SWING. 71-122 & 71-123 (Evans)

SHAGGY-MANE MUSHROOMS ALONG
FLINT RIVER DIKE. 71-183
(Cummings)

OUTPUTS. 71-149 (Evans)

3-1750
Form NR-1
(Rev. March 1953)

WATERFOWL

REFUGE **Shiawassee** MONTHS OF **January** TO **April**, 19**71**

(1) Species	(2) Weeks of reporting period 1	2	3	4	5	6	7	8	9	10
Swans:										
Whistling										
Trumpeter										
Geese:										
Canada									5	1000
Cackling										
Brant										
White-fronted										
Snow										
Blue										
Other										
Ducks:										
Mallard									23	50
Black									3	4
Gadwall										
Baldpate										
Pintail										4
Green-winged teal										
Blue-winged teal										
Cinnamon teal										
Shoveler										
Wood										
Redhead										
Ring-necked										
Canvasback										
Scaup										
Goldeneye										
Bufflehead										
Ruddy										
Other										
Coot:										

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3-1750a
Cont. NR-1
(Rev. March 1953)

WATERFOWL
(Continuation Sheet)

REFUGE **Shiawassee** MONTHS OF **January** TO **April**, 19**71**

(1) Species	(2) Weeks of reporting period: 11	12	13	14	15	16	17	18	(3) Estimated waterfowl days use	(4) Production: Broods seen	Estimated total
Swans:											
Whistling	4	100	400	3,500	3,600	80	10	4	53,886		
Trumpeter											
Geese:											
Canada	2,500	30,000	15,000	17,000	17,000	18,000	10,000	5,000	808,535		
Cackling											
Brant											
White-fronted											
Snow			5	0	1	1			49		
Blue			10	2	0	0			84		
Other											
Ducks:											
Mallard	1,000	1,000	1,500	6,000	6,000	4,000	2,000	1,000	159,011		
Black	300	300	500	1,000	1,000	800	400	400	32,249		
Gadwall				10	10	10			210		
Baldpate				20	60	20	20	20	980		
Pintail	10	10	1,000	4,000	2,000	1,000	200	-	57,568		
Green-winged teal				20	40	600	400	-	7,420		
Blue-winged teal			4	200	400	400	400	400	12,628		
Cinnamon teal											
Shoveler				4	20	20	30	40	798		
Wood			4	50	200	200	300	300	7,378		
Redhead			4	60	40	10	-	-	798		
Ring-necked				60	20	6	-	-	602		
Canvasback				40	300	10	2	-	2,464		
Scaup		2	10	300	300	10	10	10	4,494		
Goldeneye			10	60	20	20	-	-	770		
Bufflehead			6	40	10	10	10	10	602		
Ruddy				2	4	10	10	10	252		
Other											
Coots:			10	100	300	500	500	500	13,370		

(over)

	(5) Total Days Use	(6) Peak Number	(7) Total Production	SUMMARY
Swans	53,886	3,600		Principal feeding areas Pools 1 and 2; refuge croplands
Geese	808,668	30,000		
Ducks	287,924	11,866		Principal nesting areas Pools 1 and 2
Coots	13,370	500		
				Reported by Refuge Personnel

INSTRUCTIONS (See Secs. 7531 through 7534, Wildlife Refuges Field Manual)

(1) Species: In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and national significance.

(2) Weeks of Reporting Period: Estimated average refuge populations.

(3) Estimated Waterfowl Days Use: Average weekly populations x number of days present for each species.

(4) Production: Estimated number of young produced based on observations and actual counts on representative breeding areas. Brood counts should be made on two or more areas aggregating 10% of the breeding habitat. Estimates having no basis in fact should be omitted.

(5) Total Days Use: A summary of data recorded under (3).

(6) Peak Number: Maximum number of waterfowl present on refuge during any census of reporting period.

(7) Total Production: A summary of data recorded under (4).

Interior Duplicating Section, Washington, D. C.
1953

3-1750
Form NR-1
(Rev. March 1953)

WATERFOWL

REFUGE [redacted] MONTHS OF May TO Sept., 1971

(1) Species	(2) Weeks of reporting period									
	1	2	3	4	5	6	7	8	9	10
Swans:										
Whistling	4	4	4	2						
Trumpeter										
Geese:										
Canada	1,000	1,100	1,200	1,200	1,200	1,200	1,100	1,000	900	800
Cackling										
Brant										
White-fronted										
Snow										
Blue										
Other										
Ducks:										
Mallard	700	700	700	700	700	700	500	300	200	200
Black	30	30	30	30	30	30	20	20	20	20
Gadwall										
Baldpate										
Pintail										
Green-winged teal	10	10								
Blue-winged teal	400	400	400	400	300	300	100	100	100	100
Cinnamon teal										
Shoveler	10	4								
Wood	300	300	300	300	300	300	150	150	150	150
Redhead										
Ring-necked										
Canvasback										
Scaup										
Goldeneye										
Bufflehead	2									
Ruddy	6									
Other										
Coot:	1,000	1,000	1,000	500	400	400	300	300	200	100

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3-1750a
Cont. NR-1
(Rev. March 1953)

WATERFOWL
(Continuation Sheet)

REFUGE Shiawassee MONTHS OF May TO Sept., 1971

(1) Species	(2) Weeks of reporting period 11	12	13	14	15	16	17	18	(3) Estimated waterfowl days use	(4) Production Broods seen	Estimated total
Swans:											
Whistling									98		
Trumpeter	0										
Geese:											
Canada	700	500	500	500	600	650	650	650	108,500	60	292
Cackling											
Brant											
White-fronted											
Snow											
Blue											
Other											
Ducks:											
Mallard	200	200	200	200	300	300	400	400	53,900	7	60
Black	20	20	20	40	40	40	50	50	3,780		
Gadwall											
Baldpate											
Pintail											
Green-winged teal				10	20	30	30	30	980		
Blue-winged teal	100	100	100	150	200	200	300	300	28,350	1	6
Cinnamon teal											
Shoveler							2	2	126		
Wood	150	150	150	150	150	200	300	300	27,650	4	35
Redhead											
Ring-necked											
Canvasback											
Scaup											
Goldeneye											
Bufflehead											
Ruddy											
Other											
Coots:	100	50							37,450		

(over)

	(5) Total Days Use	(6) Peak Number	(7) Total Production
Swans	98	4	-
Geese	108,500	1,200	292
Ducks	114,786	1,458	101
Coots	37,450	1,000	0

SUMMARY

Principal feeding areas

Principal nesting areas

Reported by Refuge Personnel

INSTRUCTIONS (See Secs. 7531 through 7534, Wildlife Refuges Field Manual)

(1) Species: In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and national significance.

(2) Weeks of Reporting Period: Estimated average refuge populations.

(3) Estimated Waterfowl Days Use: Average weekly populations x number of days present for each species.

(4) Production: Estimated number of young produced based on observations and actual counts on representative breeding areas. Brood counts should be made on two or more areas aggregating 10% of the breeding habitat. Estimates having no basis in fact should be omitted.

(5) Total Days Use: A summary of data recorded under (3).

(6) Peak Number: Maximum number of waterfowl present on refuge during any census of reporting period.

(7) Total Production: A summary of data recorded under (4).

Interior Duplicating Section, Washington, D. C.
1953

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WATERFOWL

REFUGE Shiawassee MONTHS OF Sept. TO January, 19 72

(1) Species	Sept. 1	4	5	2	11	12	3	18	19	4	25	26	5	Oct. 2	3	6	9	10	7	16	17	8	23	24	9	30	31	10	Nov. 6
Swans:	(2) Weeks of reporting period																												
Whistling																													
Trumpeter																													
Geese:																													
Canada	800		800			7,000			15,000			20,000			7,000			12,000			12,000			12,000			12,000	
Cackling																													
Brant																													
White-fronted																													
Snow									3			20			20			30			30			60			60	
Blue									20			140			140			200			200			740			740	
Other																													
Ducks:																													
Mallard	1,000		2,000			5,000			9,000			11,000			6,000			35,000			35,000			35,000			12,000	
Black	300		400			1,000			1,500			2,500			1,000			6,000			6,000			6,000			6,000	
Gadwall																													
Baldpate	50		100			200			500			1,000			1,000			1,000			1,000			500			5,000	
Pintail	20		100			1,000			2,000			3,000			3,000			3,000			4,000			5,000			4,000	
Green-winged teal	200		300			400			600			1,000			2,000			2,000			2,000			1,000			1,000	
Blue-winged teal	400		600			1,000			1,500			2,000			1,000			1,000			1,000			500			500	
Cinnamon teal																													
Shoveler																													
Wood	500		700			1,000			1,500			2,000			2,000			3,000			3,000			2,000			2,000	
Redhead																								5			5		
Ring-necked																								4			10		
Canvasback																						2		10			20		
Scaup																													
Goldeneye																													
Bufflehead																								4			4		
Ruddy																								35			20		
Other																													
Coot:	50		100			200			1,000			2,000			3,000			3,000			4,000			4,000			4,000	

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13,000 total ducks

3-1750a
Cont. NR-1
(Rev. March 1953)

WATERFOWL
(Continuation Sheet)

REFUGE _____ MONTHS OF _____ TO _____, 19____

(1) Species	(2) Weeks of reporting period: 7 11	13 12	14 13	20 14	21 15	27 16	Dec. 26 17	4 18	5	11	12	18	19	25	26	31	(3) Estimated waterfowl days use	(4) Production: Broods seen	Estimated total
Swans:																			
Whistling									0		8		1		1		70		
Trumpeter																			
Geese:																			
Canada	12,000		14,000		12,000		5,000		5,000		5,000		5,000		5,000		1,131,200		
Cackling																			
Brant																			
White-fronted																			
Snow	20		5		0		0		0		0		0		-		1,736		
Blue	780		195		0		0		0		0		0		-		22,085		
Other																			
Ducks:																			
Mallard	50,000		35,000		12,000		5,000		5,000		4,000		1,000		500		1,844,500		
Black	5,000		3,500		1,200		500		500		4,000		500		100		296,800		
Gadwall																			
Baldpate	1,000		1,000		500		200		-		-		-				91,350		
Pintail	6,000		5,000		1,000		500		-		-		-				257,740		
Green-winged teal	300		200		-		-										77,000		
Blue-winged teal	200		100		-		-										61,600		
Cinnamon teal																			
Shoveler	200		200		-		-										2,800		
Wood	2,000		1,000		-		-										144,900		
Redhead																	70		
Ring-necked	10		10		10		10										378		
Canvasback	20		20		-		-										504		
Scaup	20		20		10		10												
Goldeneye																			
Bufflehead	10		5		-		-										161		
Ruddy	20		10		-		-										595		
Other																			
Coots:																			
	5,000		5,000		-		-										219,450		

(over)

	(5) Total Days Use	(6) Peak Number	(7) Total Production
Swans	70	8	
Geese	1,154,421	20,160	
Ducks	2,778,398	64,780	
Coots	219,450	5,000	

SUMMARY

Principal feeding areas Farm Units 1, 3 and 4

Principal nesting areas

Reported by Refuge Personnel

INSTRUCTIONS (See Secs. 7531 through 7534, Wildlife Refuges Field Manual)

(1) Species: In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and national significance.

(2) Weeks of Reporting Period: Estimated average refuge populations.

(3) Estimated Waterfowl Days Use: Average weekly populations x number of days present for each species.

(4) Production: Estimated number of young produced based on observations and actual counts on representative breeding areas. Brood counts should be made on two or more areas aggregating 10% of the breeding habitat. Estimates having no basis in fact should be omitted.

(5) Total Days Use: A summary of data recorded under (3).

(6) Peak Number: Maximum number of waterfowl present on refuge during any census of reporting period.

(7) Total Production: A summary of data recorded under (4).

Interior Duplicating Section, Washington, D. C.
1953

3-1751
Form NR-1A
(Nov. 1945)

MIGRATORY BIRDS
(other than waterfowl)

Refuge Shiawassee Months of January to April 1957

(1) Species	(2) First Seen		(3) Peak Numbers		(4) Last Seen		(5) Production			(6) Total
Common Name	Number	Date	Number	Date	Number	Date	Number Colonies	Total # Nests	Total Young	Estimated Number
I. Water and Marsh Birds:										
Great Blue Heron	2	3/?	200	4/30						200
Pied-billed Grebe	1	4/6	20	4/30						20
Horned Grebe	1	4/15	5	4/30						5
Kingfisher	1	4/15	20	4/30						20
Common Loon	1	4/30	1	4/30						1
Sora Rail	1	4/23	1	4/30						1
II. Shorebirds, Gulls and Terns:										
Killdeer	1	4/5	20	4/30						20
Pectoral Sandpiper	109	4/16	200	4/25						200
Bonaparte's Gull	10	4/16	10	4/16						10
Common Tern	1	4/16	10	4/30						10
Greater Yellowlegs	1	4/16	30	4/20						30

(over)

(1)	(2)		(3)		(4)	(5)	(6)
III. Doves and Pigeons:							
Mourning dove	Winter resident		100	4/30			100
White-winged dove							
IV. Predaceous Birds:							
Golden eagle							
Duck hawk							
Horned owl	Resident Species						6
Magpie							
Raven							
Crow	Winter resident		30	4/30			30
Snowy Owl	1	1/8	1	Feb.			1
Bald Eagle	1	3/4	1	4/6			1
Golden Eagle	1	3/27	1	4/6			1
Turkey Vulture	1	3/4	6	4/30			6
Am. R-legged Hawk	Winter resident		10	3/4			20

Reported by.....

INSTRUCTIONS

(1) Species: Use the correct names as found in the A.O.U. Checklist, 1931 Edition, and list group in A.O.U. order. Avoid general terms as "seagull", "tern", etc. In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and National significance. Groups: I. Water and Marsh Birds (Gaviiformes to Ciconiiformes and Gruiiformes)
II. Shorebirds, Gulls and Terns (Charadriiformes)
III. Doves and Pigeons (Columbiformes)
IV. Predaceous Birds (Falconiformes, Strigiformes and predaceous Passeriformes)

(2) First Seen: The first refuge record for the species for the season concerned.

(3) Peak Numbers: The greatest number of the species present in a limited interval of time.

(4) Last Seen: The last refuge record for the species during the season concerned.

(5) Production: Estimated number of young produced based on observations and actual counts.

(6) Total: Estimated total number of the species using the refuge during the period concerned.

INT.-DUP. SEC., WASH., D.C.

59317

3-1751
Form NR-1A
(Nov. 1945)

MIGRATORY BIRDS
(other than waterfowl)

Refuge Shiawassee Months of May to August 1945

(1) Species	(2) First Seen		(3) Peak Numbers		(4) Last Seen		(5) Production			(6) Total
Common Name	Number	Date	Number	Date	Number	Date	Number Colonies	Total # Nests	Total Young	Estimated Number
I. Water and Marsh Birds:										
Pied-billed Grebe			7	June						6
Great Blue Heron			300	August						100
Green Heron	1	May 13	10	August						10
Common Egret	3	May	3	May						10
American Bittern	1	May	10	August						10
Black Crowned Nigh Heron	4	May 3	14	August						20
II. Shorebirds, Gulls and Terns:										
Killdeer			50	August						50
Greater Yellowlegs			40	August						10
Lesser Yellowlegs			20	August						20
Ring-billed Gull			50	August						50
Herring Gull			10	August						10
Common Tern			10	July						10
Black Tern			30	July						30
Caspian Tern			20	August						20

(over)

(1)	(2)	(3)		(4)	(5)	(6)
III. Doves and Pigeons:						
Mourning dove		300	August			300
White-winged dove						
IV. Predaceous Birds:						
Golden eagle						
Duck hawk						
Horned owl						
Magpie						
Raven						
Crow		40	August			40
Bald Eagle		3	August			3

Reported by G. J. Abbey

INSTRUCTIONS

(1) Species: Use the correct names as found in the A.O.U. Checklist, 1931 Edition, and list group in A.O.U. order. Avoid general terms as "seagull", "tern", etc. In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and National significance. Groups: I. Water and Marsh Birds (Gaviiformes to Ciconiiformes and Gruiiformes)
II. Shorebirds, Gulls and Terns (Charadriiformes)
III. Doves and Pigeons (Columbiformes)
IV. Predaceous Birds (Falconiformes, Strigiformes and predaceous Passeriformes)

(2) First Seen: The first refuge record for the species for the season concerned.

(3) Peak Numbers: The greatest number of the species present in a limited interval of time.

(4) Last Seen: The last refuge record for the species during the season concerned.

(5) Production: Estimated number of young produced based on observations and actual counts.

(6) Total: Estimated total number of the species using the refuge during the period concerned.

INT.-DUP. SEC., WASH., D.C.

59317

3-1751
Form NR-1A
(Nov. 1945)

MIGRATORY BIRDS
(other than waterfowl)

Refuge Shiawassee Months of September to January 1972

(1) Species	(2) First Seen		(3) Peak Numbers		(4) Last Seen		(5) Production			(6) Total
Common Name	Number	Date	Number	Date	Number	Date	Number Colonies	Total # Nests	Total Young	Estimated Number
I. Water and Marsh Birds:										
Great Blue Heron			300	Sept.	1	Dec. 12				300
Green Heron			3	Sept.	1	Nov.				3
Common Egret			8	Oct.	1	Nov. 21				8
Double Crested Cormorant			1	Oct. 19	1	Oct. 19				1
II. Shorebirds, Gulls and Terns:										
Ring-billed Gull			100	Oct.	still	present				100
Herring Gull			50	Oct.	still	present				50

(over)

(1)	(2)	(3)		(4)		(5)	(6)
III. Doves and Pigeons:							
Mourning dove		250	Sept.	still	present		250
White-winged dove							
IV. Predaceous Birds:							
Golden eagle							
Duck hawk							
Horned owl	resident species						
Magpie							
Raven							
Crow	resident species						
Bald Eagle		3	Sept.	3	Nov. 28		3
Marsh Hawk		10	Sept.	2	Dec.		10
Red Tailed Hawk		20	Sept.	3	Dec.		20
Sparrow Hawk		30	Sept.	still	present		30
Snowy Owl		1	Oct.28	still	present		1
Turkey Vulture		10	Sept.	2	Nov.		10
					Reported by	Refuge Personnel	

INSTRUCTIONS

(1) Species: Use the correct names as found in the A.O.U. Checklist, 1931 Edition, and list group in A.O.U. order. Avoid general terms as "seagull", "tern", etc. In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and National significance. Groups: I. Water and Marsh Birds (Gaviiformes to Ciconiiformes and Gruiiformes)
II. Shorebirds, Gulls and Terns (Charadriiformes)
III. Doves and Pigeons (Columbiformes)
IV. Predaceous Birds (Falconiformes, Strigiformes and predaceous Passeriformes)

(2) First Seen: The first refuge record for the species for the season concerned.

(3) Peak Numbers: The greatest number of the species present in a limited interval of time.

(4) Last Seen: The last refuge record for the species during the season concerned.

(5) Production: Estimated number of young produced based on observations and actual counts.

(6) Total: Estimated total number of the species using the refuge during the period concerned.

INT.-DUP. SEC., WASH., D.C.

59317

3-1750b
Form NR-1B
(Rev. Nov. 1957)

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE

WATERFOWL UTILIZATION OF REFUGE HABITAT

Refuge Shiawassee For 12-month period ending August 31, 19 71

Reported by C. J. Bober Title Assistant Refuge Manager

(1) Area or Unit Designation	(2) Habitat Type	Acreage	(3)	Use-days	(4) Breeding Population	(5) Production
	Crops	2,974	Ducks	4,791,780	500	101
	Upland	366	Geese	2,544,948	1,000	292
	Marsh	1,179	Swans	53,984		
	Water	192	Coots	77,420	400	
	Total	4,711	Total	7,468,132	1,900	393
	Crops		Ducks			
	Upland		Geese			
	Marsh		Swans			
	Water		Coots			
	Total		Total			
	Crops		Ducks			
	Upland		Geese			
	Marsh		Swans			
	Water		Coots			
	Total		Total			
	Crops		Ducks			
	Upland		Geese			
	Marsh		Swans			
	Water		Coots			
	Total		Total			
	Crops		Ducks			
	Upland		Geese			
	Marsh		Swans			
	Water		Coots			
	Total		Total			
	Crops		Ducks			
	Upland		Geese			
	Marsh		Swans			
	Water		Coots			
	Total		Total			
	Crops		Ducks			
	Upland		Geese			
	Marsh		Swans			
	Water		Coots			
	Total		Total			

(over)

INSTRUCTIONS

All tabulated information should be based on the best available techniques for obtaining these data. Estimates having no foundation in fact must be omitted. Refuge grand totals for all categories should be provided in the spaces below the last unit tabulation. Additional forms should be used if the number of units reported upon exceeds the capacity of one page. This report embraces the preceding 12-month period, NOT the fiscal or calendar year, and is submitted annually with the May-August Narrative Report.

(1) Area or Unit: A geographical unit which, because of size, terrain characteristics, habitat type and current or anticipated management practices, may be considered an entity apart from other areas in the refuge census pattern. The combined estimated acreages of all units should equal the total refuge area. A detailed map and accompanying verbal description of the habitat types of each unit should be forwarded with the initial report for each refuge, and thereafter need only be submitted to report changes in unit boundaries or their descriptions.

(2) Habitat: Crops include all cultivated croplands such as cereals and green forage, planted food patches and agricultural row crops; upland is all uncultivated terrain lying above the plant communities requiring seasonal submergence or a completely saturated soil condition a part of each year, and includes lands whose temporary flooding facilitates use of non-aquatic type foods; marsh extends from the upland community to, but not including, the water type and consists of the relatively stable marginal or shallow-growing emergent vegetation type, including wet meadow and deep marsh; and in the water category are all other water areas inundated most or all of the growing season and extending from the deeper edge of the marsh zone to strictly open-water, embracing such habitat as shallow playa lakes, deep lakes and reservoirs, true shrub and tree swamps, open flowing water and maritime bays, sounds and estuaries. Acreage estimates for all four types should be computed and kept as accurate as possible through reference to available maps supplemented by periodic field observations. The sum of these estimates should equal the area of the entire unit.

(3) Use-days: Use-days is computed by multiplying weekly waterfowl population figures by seven, and should agree with information reported on Form MR-1.

(4) Breeding Population: An estimate of the total breeding population of each category of birds for each area or unit.

(5) Production: Estimated total number of young raised to flight age.

Interior Duplicating Section, Washington, D. C. 27580

3-1750c
Form NR-1C
(Sept. 1960)

WATERFOWL HUNTER KILL SURVEY

Refuge Shiawassee Year 1971

(1) Weeks of Hunting	(2) No. Hunters Checked	(3) Hunter Hours	(4) Waterfowl Species and Nos. of Each Bagged	(5) Total Bagged	(6) Crippling Loss	(7) Total Kill	(8) Est. No. of Hunters	(9) Est. Total Kill
10/1-7	602	3,010	Canada Goose	145	"	145	602	145
10/8-14	680	3,400	" "	124	"	124	659	124
10/15-21	604	3,020	" "	136	"	136	571	136
10/22-28	677	3,385	" " (1 Snow)	41	"	41	677	41
10/29-11/4	610	3,050	" "	7	"	7	610	7
11/5-11	466	2,330	" "	5	"	5	466	5
11/12-14	150	750	" "	2	"	2	150	2
Sub Totals	3,789	18,945		460	"	460	3,789	460
	Permits Issued By State							
10/1-31	511	1,963	" "	138	"	138	511	138
11/1-14	138	473	" "	8	"	8	138	8
Totals	4,438	21,381	Canada Goose - 605 Snow Goose - 1	606	"	606	4,438	606

(over)

INSTRUCTIONS

(1) The first week of hunting begins with opening day and ends at the close of hunting 6 days later. Successive weeks follow the same pattern.

(2) The goal is to survey a minimum of 25 percent of refuge hunters each week and to record data only from those who have completed their day's hunting. This information should be collected during each day of the week and in each area hunted in relative proportion to the hunter effort expended. When the 25 percent goal cannot be achieved, particular care should be taken to collect representative data.

(3) Record the total number of hours the hunters spent hunting on the refuge.

(4) List waterfowl species in decreasing order of numbers bagged. Sample entry: Mallard (61), Pintail (36), Redhead (16), Gadwall (11), Widgeon (6), Coot (4), Canada Goose (3), Green-winged Teal (1).

(5) Record total numbers of waterfowl bagged.

(6) Record total numbers of waterfowl reported knocked down but not recovered.

(7) Total of Columns 5 and 6.

(8) Estimate the total number of hunters who hunted on the refuge during the week, including hunters checked (Column 2).

(9) Kill sample projected to 100 percent. Column 9 = $\frac{\text{Column 8}}{\text{Column 2}}$ x Column 7.

3-1752
Form NR-2
(April 1946)

UPLAND GAME BIRDS

Refuge Shiawassee Months of January to April, 1971

(1) Species	(2) Density		(3) Young Produced		(4) Sex Ratio	(5) Removals			(6) Total	(7) Remarks
Common Name	Cover types, total acreage of habitat	Acres per Bird	Number broods obs'v'd.	Estimated Total	Percentage	Hunting	For Re-stocking	For Research	Estimated number using Refuge	Pertinent information not specifically requested. List introductions here.
Ring-necked Pheasant	**Croplands, bottom-land hardwoods & marsh - 8,000 ac.**								**10**	**Only rarely observed**

INSTRUCTIONS

Form NR-2 - UPLAND GAME BIRDS.*

(1) SPECIES: Use correct common name.

(2) DENSITY: Applies particularly to those species considered in removal programs (public hunts, etc.). Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge; once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottomland hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.

(3) YOUNG PRODUCED: Estimated number of young produced, based upon observations and actual counts in representative breeding habitat.

(4) SEX RATIO: This column applies primarily to wild turkey, pheasants, etc. Include data on other species if available.

(5) REMOVALS: Indicate total number in each category removed during the report period.

(6) TOTAL: Estimated total number using the refuge during the report period. This may include resident birds plus those migrating into the refuge during certain seasons.

(7) REMARKS: Indicate method used to determine population and area covered in survey. Also include other pertinent information not specifically requested.

* Only columns applicable to the period covered should be used.

3-1752
Form NR-2
(April 1946)

UPLAND GAME BIRDS

Refuge Shiawassee Months of May to August, 19 71

(1) Species	(2) Density		(3) Young Produced		(4) Sex Ratio	(5) Removals			(6) Total	(7) Remarks
Common Name	Cover types, total acreage of habitat	Acres per Bird	Number broods obs'v'd.	Estimated Total	Percentage	Hunting	For Re-stocking	For Research	Estimated number using Refuge	Pertinent information not specifically requested. List introductions here.
Ring-necked Pheasant	8,000 acres croplands, hardwoods, and marshes, bottomlands.	800	0	0					10	Rarely seen

INSTRUCTIONS

Form NR-2 - UPLAND GAME BIRDS.*

(1) SPECIES: Use correct common name.

(2) DENSITY: Applies particularly to those species considered in removal programs (public hunts, etc.). Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge; once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottomland hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.

(3) YOUNG PRODUCED: Estimated number of young produced, based upon observations and actual counts in representative breeding habitat.

(4) SEX RATIO: This column applies primarily to wild turkey, pheasants, etc. Include data on other species if available.

(5) REMOVALS: Indicate total number in each category removed during the report period.

(6) TOTAL: Estimated total number using the refuge during the report period. This may include resident birds plus those migrating into the refuge during certain seasons.

(7) REMARKS: Indicate method used to determine population and area covered in survey. Also include other pertinent information not specifically requested.

* Only columns applicable to the period covered should be used.

3-1752
Form NR-2
(April 1946)

UPLAND GAME BIRDS

Refuge Shiawassee Months of September to January, 19 72

(1) Species	(2) Density		(3) Young Produced		(4) Sex Ratio	(5) Removals			(6) Total	(7) Remarks
Common Name	Cover types, total acreage of habitat	Acres per Bird	Number broods obs'v'd.	Estimated Total	Percentage	Hunting	For Re-stocking	For Research	Estimated number using Refuge	Pertinent information not specifically requested. List introductions here.
Ring-Necked Pheasant	8,000 Acres Croplands, hardwoods, marshes, and bottomlands	1/00	0	0					20	Rarely seen

INSTRUCTIONS

Form NR-2 - UPLAND GAME BIRDS.*

(1) SPECIES: Use correct common name.

(2) DENSITY: Applies particularly to those species considered in removal programs (public hunts, etc.). Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge; once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottomland hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.

(3) YOUNG PRODUCED: Estimated number of young produced, based upon observations and actual counts in representative breeding habitat.

(4) SEX RATIO: This column applies primarily to wild turkey, pheasants, etc. Include data on other species if available.

(5) REMOVALS: Indicate total number in each category removed during the report period.

(6) TOTAL: Estimated total number using the refuge during the report period. This may include resident birds plus those migrating into the refuge during certain seasons.

(7) REMARKS: Indicate method used to determine population and area covered in survey. Also include other pertinent information not specifically requested.

* Only columns applicable to the period covered should be used.

3-1753
Form NR-3
(June 1945)

BIG GAME

Refuge Shiawassee Calendar Year 1971

(1) Species	(2) Density	(3) Young Produced	(4) Removals				(5) Losses			(6) Introductions		(7) Estimated Total Refuge Population		(8) Sex Ratio
Common Name	Cover types, total Acreage of Habitat	Number	Hunting	For Re-stocking	Sold	For Research	Predation	Disease	Winter Loss	Number	Source	At period of Greatest use	As of Dec. 31	
White-tailed Deer	Bottomland hardwoods, croplands, marsh 8,000 acres	300	135									535	400	1:5

Remarks:

Estimated removals by hunting include 45 taken during firearm season, 70 during archery season, and an estimated 20 illegal and/or unretrievable kills.

Reported by _____

INSTRUCTIONS

Form NR-3 - BIG GAME

(1) SPECIES: Use correct common name; i.e., Mule deer, black-tailed deer, white-tailed deer. It is unnecessary to indicate sub-species such as northern or Louisiana white-tailed deer.

(2) DENSITY: Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge: once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottomland hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.

(3) YOUNG PRODUCED: Estimated total number of young produced on refuge.

(4) REMOVALS: Indicate total number in each category removed during the year.

(5) LOSSES: On the basis of known records or reliable estimates indicate total losses in each category during the year.

(6) INTRODUCTIONS: Indicate the number and refuge or agency from which stock was secured.

(7) TOTAL REFUGE POPULATION: Give the estimated population of <u>each</u> <u>species</u> on the refuge at period of its greatest abundance and also as of Dec. 31.

(8) SEX RATIO: Indicate the percentage of males and females of each species as determined from field observations or through removals.

17060

3-1754
Form NR-4
(June 1945)

SMALL MAMMALS

Refuge Shiawassee Year ending April 30, 1971

(1) Species	(2) Density		(3) Removals					(4) Disposition of Furs						(5)
								Share Trapping						
Common Name	Cover Types & Total Acreage of Habitat	Acres Per Animal	Hunting	Fur Harvest	Predator * Control	For Re-stocking	For Re-search	Permit Number	Trappers Share	Refuge share	Total Refuge Furs Shipped	Furs Donated	Furs Destroyed	Total Popula-tion
Cottontail Rabbit	8,000 ac. croplands, bottomland hardwoods, and marshes.													Unknown
Fox Squirrel	" " "													Unknown
Red Squirrel	" " "													Unknown
Opposum	" " "			13										30
Raccoon	" " "			7	2									50
Striped Skunk	" " "			6										20
Woodchuck	" " "				10									200
Red Fox	" " "			32										100
Muskrat	1,000 ac. Cattail marsh, rivers, and drainage ditches.			220				T-9940	147	73				3000
				289				T-9941	183	96				
				420				T-9942	140					
Beaver	" " "			8										70
Mink	" " "													Unknown
Weasel	" " "													Unknown

* List removals by Predator Animal Hunter

REMARKS:

Reported by _____

INSTRUCTIONS

Form NR-4 - **SMALL MAMMALS** (Include data on all species of importance in the management program; i. e., muskrats, beaver, coon, mink, coyote. Data on small rodents may be omitted except for estimated total population of each species considered in control operations.)

(1) SPECIES: Use correct common name. Example: Striped skunk, spotted skunk, short-tailed weasel, gray squirrel, fox squirrel, white-tailed jackrabbit, etc. (Accepted common names in current use are found in the "Field Book of North American Mammals" by H. E. Anthony and the "Manual of the Vertebrate Animals of the Northeastern United States" by David Starr Jordan.)

(2) DENSITY: Applies particularly to those species considered in removal programs. Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge; once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottom land hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.

(3) REMOVALS: Indicate the total number under each category removed since April 30 of the previous year, including any taken on the refuge by Service Predatory Animal Hunter. Also show any removals not falling under headingslisted.

(4) DISPOSITION OF FUR: On share-trapped furs list the permit number, trapper's share, and refuge share. Indicate the number of pelts shipped to market, including furs taken by Service personnel. Total number of pelts of each species destroyed because of unprimeness or damaged condition, and furs donated to institutions or other agencies should be shown in the column provided.

(5) TOTAL POPULATION: Estimated total population of each species reported on as of April 30.

REMARKS: Indicate inventory method(s) used, size of sample area(s), introductions, and any other pertinent information not specifically requested.

32/15

3-1755
Form NR-5

DISEASE

Refuge Shiawassee Year 1972

Botulism

Period of outbreak None

Period of heaviest losses _____

Losses:

	Actual Count	Estimated
(a) Waterfowl		
(b) Shorebirds		
(c) Other		

Number Hospitalized	No. Recovered	% Recovered
(a) Waterfowl		
(b) Shorebirds		
(c) Other		

Areas affected (location and approximate acreage) _____

Water conditions (average depth of water in sickness areas, reflooding of exposed flats, etc.

Condition of vegetation and invertebrate life _____

Remarks _____

Lead Poisoning or other Disease

Kind of disease None

Species affected _____

Number Affected Species	Actual Count	Estimated

Number Recovered _____

Number lost _____

Source of infection _____

Water conditions _____

Food conditions _____

Remarks _____

INT.-DUP., D.C.- 53818-59

3-1757
Form NR-7
(Rev. June 1960)

NONAGRICULTURAL COLLECTIONS, RECEIPTS, AND PLANTINGS (1)

Refuge [redacted] Year 19 71

Species	Collections and Receipts (Seeds, rootstocks, trees, shrubs) Amount (Lbs., bus., etc.)	(2) C or R	Date	Method or Source	Cost	(3) Total Amount on Hand	Plantings (Marsh - Aquatic - Upland) Location of Area Planted	Rate of Seeding or Planting	Amount Planted (Acres or Yards of Shoreline)	Amount and Nature of Propagules	Date	Survival	Cause of Loss
							Nesting Islands Pools 1 & 2	2 lb./ac.	10 ac.	Alsike Clover	July Sept.	25%	Lack of precip.
							Nature Trail Ewen Road	½ lb./ac.	1 ac.	Ladino Clover	June	75%	
							Dikes Constructed Under Contract	18 lb./ac	65 ac.	Brome Grass ½ lbs. Red Fescue ½ lbs. Rye Grass ½ lbs. Ladino Clover 2 lbs. Alsike Clover 2 lbs. Birdsfoot Trefoil 2 lbs.	Sept	60%	Lack of growing weather

(1) Report agronomic farm crops on Form NR-8
(2) C = Collections and R = Receipts
(3) Use "S" to denote surplus

Total acreage planted:
Marsh and aquatic _____
Hedgerows, cover patches _____
Food strips, food patches _____
Forest plantings _____

Remarks: _____

76148

3-1757
Form NR-7
(Rev. June 1960)

NONAGRICULTURAL COLLECTIONS, RECEIPTS, AND PLANTINGS (1)

Refuge Shiawassee Year 19 72

	Collections and Receipts (Seeds, rootstocks, trees, shrubs)						Plantings (Marsh - Aquatic - Upland)						
Species	Amount (Lbs., bus., etc.)	(2) C or R	Date	Method or Source	Cost	(3) Total Amount on Hand	Location of Area Planted	Rate of Seeding or Planting	Amount Planted (Acres or Yards of Shoreline)	Amount and Nature of Propagules	Date	Survival	Cause of Loss
None							None						

(1) Report agronomic farm crops on Form NR-8
(2) C = Collections and R = Receipts
(3) Use "S" to denote surplus

Total acreage planted:
Marsh and aquatic _____
Hedgerows, cover patches _____
Food strips, food patches _____
Forest plantings _____

Remarks: _____

76148

3-1758
Form NR-8
(Rev. Jan. 1956)

Fish and Wildlife Service Branch of Wildlife Refuges

CULTIVATED CROPS - HAYING - GRAZING

Refuge Shiawassee County Saginaw State Michigan

Cultivated Crops Grown	Permittee's Share Harvested		Government's Share or Return				Total Acreage Planted	Green Manure, Cover and Waterfowl Browsing Crops Type and Kind	Total Acreage
			Harvested		Unharvested				
	Acres	Bu./Tons	Acres	Bu./Tons	Acres	Bu./Tons			
Soybeans	350	11,008	7	244	-	-	376	Ryegrass in corn	123
White beans	385	5,720	27	468	-	-	665		
Kidney beans	90	920	-	-	-	-	90	Clover w/small grain	206
Field Corn	563	40,826	77	3,005	98	6,974	738	Wheat/Rye/Oats	597
Soygum					10	400	10		
Sudex					15	600	15	Winter wheat	143
Barley			21	950	146	5,640			
Millet					25	1,250	25		
Wheat	145	7,066	31	2,660	10	450	186		
Buckwheat					500	25,000	500		
Sugar beets	58	1,450 T.			13	325 T.	71		
								Fallow Ag. Land	0

No. of Permittees: Agricultural Operations 17 Haying Operations 0 Grazing Operations 0

Hay - Improved (Specify Kind)	Tons Harvested	Acres	Cash Revenue	GRAZING	Number Animals	AUM'S	Cash Revenue	ACREAGE
				1. Cattle				
				2. Other				
				1. Total Refuge Acreage Under Cultivation				2,843
Hay - Wild				2. Acreage Cultivated as Service Operation				0

DIRECTIONS FOR PREPARING FORM NR-8
CULTIVATED CROPS - HAYING - GRAZING

Report Form NR-8 should be prepared on a calendar-year basis for all crops which were planted during the calendar year and for haying and grazing operations carried on during the same period.

Separate reports shall be furnished for Refuge lands in each county when a refuge is located in more than one county or State.

Cultivated Crops Grown - List all crops planted, grown and harvested on the refuge during the reporting period regardless of purpose. Crops in kind which have been planted by more than one permittee or this Service shall be combined for reporting purposes.

Permittee's Share - Only the number of acres utilized by the permittee for his own benefit should be shown under the Acres column, and only the number of bushels of farm crops harvested by the permittee for himself should be shown under the Bushels Harvested column. Report all crops harvested in bushels or fractions thereof except such crops as silage, watermelons, cotton, tobacco, and hay, which should be reported in tons or fractions thereof.

Government's Share or Return - Harvested - Show the acreage and number of bushels harvested for the Government of crops produced by permittees or refuge personnel. Unharvested - Show the exact acreage and the estimated number of bushels of grain available for wildlife. If grazing is made available to waterfowl through the planting of grain, cover, green manure, grazing or hay crops, estimate the tonnage of green food produced or utilized and report under Bushels Unharvested column.

Total Acreage Planted - Report all acreage planted, including crop failures.

Green Manure, Cover and Waterfowl Grazing Crops - Specify the acreage, kind and purpose of the crop. These crops and the acreage may be duplicated under cultivated crops if planted during the year, or a duplication may occur under hay if the crop results from a perennial planting.

Hay - Improved - List separately the kinds of improved hay grown. Annual plantings should also be reported under Cultivated Crops, and perennial hay should be listed in the same manner at time of planting.

Total Refuge Acreage Under Cultivation - Report total land area devoted to agricultural purposes during the year.

INT.DUP.,D.C.61-88850

3-1570
NR-88
(4/54)

REFUGE GRAIN REPORT

Refuge Shiawassee Months of January through December, 1971

(1) Variety*	(2) On Hand Beginning of Period	(3) Received During Period	(4) Total	(5) Grain Disposed of				(6) On Hand End of Period	(7) Proposed or Suitable Use*		
				Transferred	Seeded	Fed	Total		Seed	Feed	Surplus
shelled corn	890	1,985	2,875	1,147		284		1,444		979	465

(8) Indicate shipping or collection points

(9) Grain is stored at 234 bu. at Birch Run Elevator; 1,210 bu. in Refuge secondary headquarters grainery

(10) Remarks Surplus for transfer to Seney Refuge

*See instructions on back.

NR-8a

REFUGE GRAIN REPORT

This report should cover all grain on hand, received, or disposed of, during the period covered by this narrative report.

Report all grain in bushels. For the purpose of this report the following approximate weights of grain shall be considered equivalent to a bushel: Corn (shelled)—55 lb., corn (ear)—70 lb., wheat—60 lb., barley—50 lb., rye—55 lb., oats—30 lb., soy beans—60 lb., millet—50 lb., cowpeas—60 lb., and mixed—50 lb. In computing volume of granaries, multiply the cubic contents (cu. ft.) by 0.8 bushels.

(1) List each type of grain separately and specifically, as flint corn, yellow dent corn, square deal hybrid corn, garnet wheat, red May wheat, durum wheat, spring wheat, proso millet, combine milo, new era cowpeas, mikado soy beans, etc. Mere listing as corn, wheat, and soybeans will not suffice, as specific details are necessary in considering transfer of seed supplies to other refuges. Include only domestic grains; aquatic and other seeds will be listed on NR–9.

(3) Report all grain received during period from all sources, such as transfer, share cropping, or harvest from food patches.

(4) A total of columns 2 and 3.

(6) Column 4 less column 5.

(7) This is a proposed break-down by varieties of grain listed in column 6. Indicate if grain is suitable for seeding new crops.

(8) Nearest railroad station for shipping and receiving.

(9) Where stored on refuge: "Headquarters granary," etc.

(10) Indicate here the source of grain shipped in, destination of grain transferred, data on condition of grain, unusual uses proposed.

INT.-DUP. SEC., WASH., D.C. 17065

3-1761
Form NR-11
(2/46)

TIMBER REMOVAL

Refuge [redacted] Year 1972

Permittee	Permit No.	Unit or Location	Acreage	No. of Units Expressed in B. F., ties, etc.	Rate of Charge	Total Income	Reservations and/or Diameter Limits	Species Cut
[redacted]								

Total acreage cut over.....

Total income.....

No. of units removed B. F.....
Cords.....
Ties.....
.....

Method of slash disposal.....

INT.-DUP. SEC., WASH., D.C. 36103

3-1979 (NR-12)
(9/63)

Bureau of Sport Fisheries and Wildlife

ANNUAL REPORT OF PERSTICIDE APPLICATION

Refuge: Shiawassee

Proposal Number:

Reporting Year: 1971

INSTRUCTIONS: Wildlife Refuges Manual, secs. 3252d, 3394b and 3395.

Date(s) of Application	List of Target Pest(s)	Location of Area Treated	Total Acres Treated	Chemical(s) Used	Total Amount of Chemical Applied	Application Rate	Carrier and Rate	Method of Application
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
May 28 thru July 6	Willow, cottonwood, Canada thistle, velvet leaf, nettles, poison ivy	Eastwood Drain, Riverside Dike, Flint River Dike, Pool 1 & Pool 3 Dike, and Curtis Road shoulder	117	2,4-D	58 lbs.	½ lb/acre	water 7½ pts. per 125 gal.	truck-mounted Kroner broad jet sprayer

10. Summary of results (continue on reverse side, if necessary)

70% Kill on willow; some re-growth
5% Kill on cottonwoods
80% Top kill on broadleafed weeds with 20% re-growth

35500